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ABSTRACT

This guide contains processes for planning, developing, and implementing an industry-based construction cluster program in Oregon secondary schools. Each process was pilot tested and revised by Beaverton School District during the development of a model program at Beaverton High School. The guide is intended to help other school districts implement new programs, update existing programs, or adopt and use simple components of the model as appropriate to their local districts. The guide offers sequential process steps as derived from the Beaverton Project. These processes, incorporated as four chapters of the guide, include planning a model, developing a model construction program, implementing a model program, and using resources for a model program. The appendixes of the guide contain formats, products, and examples used by Beaverton School District. A reference and resources section is provided as a convenience to adopters. Guidelines for visiting exemplary programs and contacting personnel are listed in the resources section. A listing of local, state, and national resource agencies and their available services are part of this chapter. A listing of selected curriculum materials, support services, and special needs references is available for the construction program developers. Transparency masters have been included on the planning, development, and implemention of a model program for use in staff training. (KC)

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ADOPTER'S GUIDE
FOR
PLANNING, DEVELOPING AND IMPLEMENTING
A MODEL CONSTRUCTION CLUSTER PROGRAM

Developed as Part of Model Construction Cluster

Project Grant No. 34-048-186

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August, 1982

Beaverton School District
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AN ADOPTER'S GUIDE FOR PLANNING, DEVELOPING AND IMPLEMENTING A MODEL CONSTRUCTION CLUSTER PROGRAM

CHAPTER I

INTRODUCTION

Purpose of This Guide

This Adopter's Guide contains process recipes for planning, developing, and implementing an industry-based construction cluster program in Oregon secondary schools. Each process was pilot tested and revised by Beaverton School District in the development of a model program at Beaverton High School. Each step of the project was evaluated and modified to a standard of practicality that allows adoption in a variety of school settings.

The guide is intended to help other school districts implement new programs; update existing programs; or to adopt and utilize simple components of the model as appropriate to their local districts.

The processes utilized in this guide are equally appropriate to other vocational programs. Instruments such as the task inventory and management interview guides must be specific to the program area. The procedures and formats will be the same for all program areas.

This guide should be very helpful to school districts that are developing new construction programs. It helps to identify the needed components of a program before it becomes threaded with opinions and biases of the developers. Exemplary features are easier to establish in the beginning than to bring them into the program through modifications.

For those districts that wish to improve or update existing programs, the processes of this guide should offer a streamlined system for such efforts.

Why Have a Model Program?

Most districts participate in the development of models because they desire to improve their vocational offerings. A model program provides an opportunity to go "shopping for" exemplary features which will update and upgrade programs.

Model programs create enthusiasm among staff and serve as a vehicle for delivery of staff development. In developing exemplary practices, we also develop staff abilities to work with new program components.

Models are needed to disseminate exemplary concepts and practices into other Oregon schools. When a program can be observed in an operational setting, other schools can evaluate and adopt those components that offer advantages to their local districts. State and Federal agencies have long recognized the value of models to the dissemination of improved practices in vocational education. The development of working models have been encouraged through funded projects.

How to Use This Guide

This guide offers sequential process steps as derived from the Beaverton Project. Each listed process has been tested and evaluated during the development of this model. Those processes that provide workable solutions to program development are recommended as adoption practices in this guide.

The Appendices of the guide contain formats, products and examples utilized by Beaverton School District. These items are offered as time savers to districts that wish to adopt components of this model. Adopters are cautioned to review the materials carefully and revise them to meet the specific needs of local districts.

A reference and resources section is provided as a convenience to adopters. Guidelines for visitations to exemplary programs and contact procedures are listed in the resources section. A listing of local, state and national resource agencies and their available services are part of this chapter. A listing of selected curriculum materials, support services and special needs references are available for the construction program developers. For those planners that wish to explain the processes to other staff, transparency masters have been

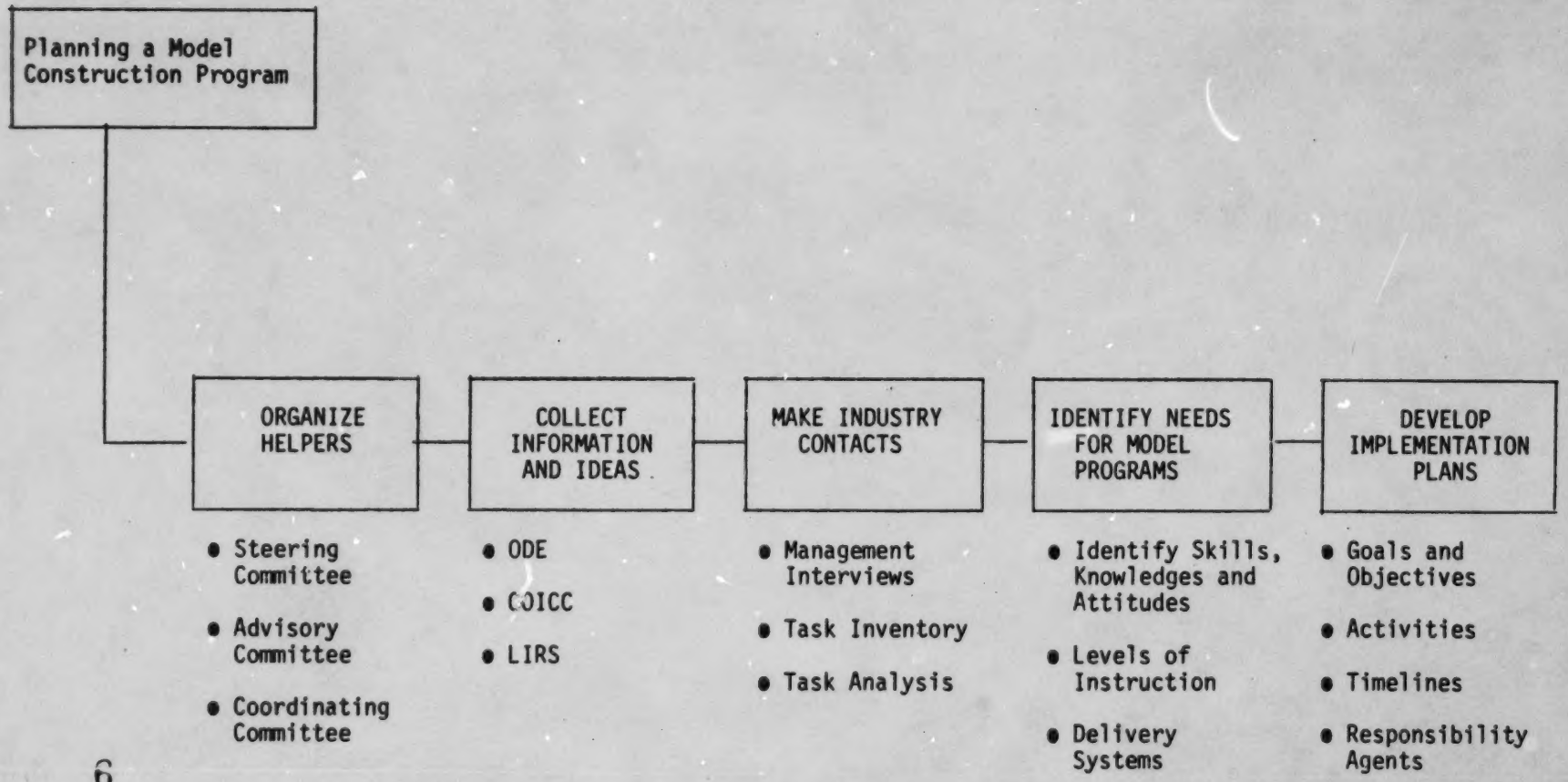
included on the planning, development, and implementation of a model program.

Why Read Further?

The content, appendices and resource sections of this guide are directed toward those who wish to adopt the total model or individual components of the model into their school district. It has the flexibility to accommodate large secondary school districts in metropolitan settings or small high schools in rural areas. If the process steps of this guide are followed in good faith and with staff enthusiasm, the outcomes will be positive and worthwhile for students. The adopter is encouraged to study each process carefully; understand the rationale for each step; and develop commitment of all involved staff before attempting to implement. With these considerations, adoptions can result in high quality and cost effective programs. Remember adoptions can be made with one-tenth the time, effort and money required in full development of a program.

CHAPTER II

STEPS IN PLANNING A MODEL CONSTRUCTION PROGRAM



CHAPTER II

PLANNING A MODEL

Organize the Helpers

Steering Committee

If an articulated program is desired, all levels to be articulated must be represented on a project steering committee. The steering committee plans and sets direction for the project; promotes involvement of other staff within their agencies; and serves to keep the project on its timelines.

The steering committee shall include representatives of:

1) High School Cluster Programs
2) Junior High School Exploratory Programs
3) Community College Construction Program
4) Apprenticeship
5) Guidance

A roster of a steering committee is shown in Appendix A.

Advisory Committee

A lay advisory committee of business, industry and labor representatives should be involved in the development of a construction program. The advisory committee should represent all key occupations to be included in the curriculum. These are:

1) Carpentry
2) Plumbing
3) Electrical
4) Painting
5) Roofing
6) Structural Ironworking
7) Masonry

The advisory committee should be utilized regularly to validate skills, knowledges and attitudes to be included in the curriculum; assist in developing a resource bank for the program; and to assist the construction instructor with the implementation process. A roster of the advisory committee is shown in Appendix B.

Coordinating Committees

Working level committees of subject specialists, counselors, and support services staff are needed to plan specific components of the program. These committees usually work under the direction of their representatives on the steering committee. Examples of coordinating committees for use in developing a model construction program are:

1) Junior High Counselors
2) High School Counselors
3) Industrial Arts Instructors
4) Sex Equity Staff
5) Cooperative Work Experience Staff
6) High School Cluster Instructors

Coordinating committees should be organized to improve coordination and communication of all people involved in the program. Their organization must consider group compatability, time efficiency, and what needs to be accomplished. These committees are necessary in projects that involve a large number of people. Smaller projects may combine the steering committee and coordinating committee functions and have one group to serve both needs. The coordinating committee structure for the Beaverton Project is shown in Appendix C.

Collect Information and Ideas

Oregon Department of Education

The Oregon Department of Education specialists have been involved with many programs in Oregon. These specialists should be contacted early in the planning process. The specialists can provide help in

identifying exemplary components and standards for construction programs. The construction program specialist is:

Mr. Ralph Little
Oregon Department of Education
700 Pringle Parkway SE
Salem, Oregon 97310
Telephone: 378-8376

Oregon Occupational Information Coordinating Committee

A contact to OOICC will provide planners with specific data on employment needs of the construction industry. The OOICC representative will either collect the information needed by your project or refer you to other agencies (i.e. State Employment Service) for additional resources. The contact at OOICC is:

Mrs. Nancy Hargis
Oregon Occupational Information
Coordinating Committee
875 Union Street N.E.
Salem, Oregon 97311

Telephone: 378-8146

Library Information Retrieval System

The LIRS search is a convenient method for collecting program information from other states. Over 150 data bases are utilized through a central computer system to search and screen thousands of documents. The planner can access the LIRS system at a cost of $10 - $30 per search. The search yields information according to the descriptors given to the LIRS operator. (See Appdendix D)

The search yields usable material for curriclum, program design and support services. It allows program developers to see what is taking place in other parts of the country and to glean exemplary ideas for their own programs.

The LIRS search may be scheduled by calling:

Chris Brooks
Library Information Retrieval System
Oregon State University Library
Corvallis, Oregon 97331
Telephone: 754-4784

The search will provide abstracts of all published documents. One of the many data bases is the ERIC system that documents all federally funded projects. Microfiche are available for all ERIC citations. A planner can review the microfiche in the basement of the OSU library and have copies reproduced from those that are appropriate to their needs.

Make Industry Contacts

Selecting a Representative Sample

A sample can be selected according to D.O.T. (Dictionary of Occupational Titles) Code, O.E.S. (Oregon Employment Statistics) Code, and S.I.C. (Standard Industrial Classification) Code. Assistance in defining a representative sample of industry can be obtained through the Oregon Occupational Information Coordinating Council and/or Oregon Employment Division. A sample must be representative of numbers employed in the occupational areas that will be addressed in the curriculum. Steps in sample identification are included as Appendix E. An example of sample classification is shown in Appendix F.

Developing an Oral Interview Guide

An oral interview guide must define the questions to be answered during interviews with the managers of industry. In order to assure that consistent information is compiled, the same questions must be asked in each industry visited. The interview guide should be carefully developed and the questions must be worded to encourage positive responses from those being interviewed. An example of the interview guide is included as Appendix G.

Scheduling and Conducting Management Interviews

An interviewer can conduct four to six interviews per day if travel distances between firms are reasonable. The interviews should be scheduled by phoning the personnel manager (large firms) or owner (small firms); describing the purpose of the interviews; and asking for 1/2 to 1 hour of their time. Scheduling should be done at least one week prior to the interview. As interviews are confirmed, a daily schedule is developed. An example schedule is shown as Appendix H.

During the actual interview, the guide should be utilized to keep discussions on target and for making notes of the findings. The interviewer must be positive about their school district and its programs and refrain from becoming defensive whenever the processes and products of the school are criticized.

The oral interview should establish a long-term relationship between the school and the firm being interviewed. It is important to assess their willingness to provide future help such as serving on advisory committees, providing work stations, hiring graduates or serving as resource persons.

Task Inventory

To properly assess the needs of business, industry and labor, an inventory of specific job skills must be conducted. Tasks and attitudes for successful employment offer a realistic base for curriculum development.

This model utilizes the standard format for task inventory as recommended by Ohio State University. Existing task inventories obtained through the LIRS search were synthesized into a composite task inventory checklist. (See Appendix I)

During the oral interviews with the management, interviewers ask the firm's help in completing a task inventory. Two checklists are left with each firm with mail-back instructions and stamped return envelopes. Each firm is asked to have a supervisor of skilled workers and a skilled worker to complete the task inventory.

Completed task inventories are compiled by a coding system that identified:

Sample Number
DOT Number
SIC Number

Task inventories may be summarized by either a hand tally or by computer analysis, depending on the number to be processed. The steps for conducting a computer analysis of task inventory data are shown in Appendix J.

Task Analysis

A second-stage process for converting job skills into curriculum is to define whether the skill is essential for entry into the job or can be learned on-the-job. The level of difficulty of a skill and the frequency of its use on the job also help determine its strength as a curriculum consideration. The process of task analysis can be handled through the program advisory committee. After the task inventory summary is complete, the instructors and their advisory committees should review the findings for specific skill items; task analyze each skill; and determine its place in the curriculum. A task analysis checklist format is included as Appendix K.

Identify Needs for Model Curriculum

Validate Skills, Knowledges and Attitudes

Using a completed task inventory summary (Appendix L_1), the instructor has a viable tool for validating the content of a curriculum. Each skill, knowledge and attitude of the task inventory must be assessed and validated by the local advisory committee. The value index shows the relative worth of each item as needed in a cross-section of occupations and industries. Based on the value indexes, content for a core curriculum can be selected. During the validation process, a task analysis of each skill can be completed. Is it required for job entry? What is the level of difficulty of each skill?

How often is the skill used on the job? Shall this skill be included in a cluster curriculum? Tasks are validated by industry and included as Appendix L_2.

Identify Grade Levels for Instructing Skills

Each instructor that is involved in teaching cluster exploration and construction preparation/specialization skills responds to the task inventory checklist. Their responses reflect whether or not the specific tasks are currently being considered in their curriculum. After all instructors make individual responses to the task listings, a summary matrix is developed to show current levels of instruction. (Appendix M)

All involved teachers (Grades 7 through community college) meet and discuss the summary of current levels of instruction. Gaps, overlaps and emphasis areas are identified from this summary. A revised matrix (Appendix N) is developed to reflect what should be happening at different levels of instruction. From this base, the instructors are able to identify a scope and sequence that leads from Grade 7 to entry employment in the construction trades.

Identify Support Services for Model Program

The management interviews explore with industry several concerns that involve school support services for construction programs. Some questions attempt to determine:

1) Which job options are appropriate for disadvantaged, handicapped and female students?
2) What are the routings into community college, apprenticeship and industry for the graduates of this program?
3) What opportunities exist for cooperative work experience in industry settings?
4) How can schools assure sex equity and avoid sex role stereotyping in operating construction programs?
5) Which related skills (i.e. math, communications) are critical to employment?

6) Which personal qualities determine success in employment (i.e. getting to work on time, cooperative attitude, honesty)?

A summary of the management interviews gives support services staff a basis for developing a career-based guidance program; providing remedial help to students; offering help in placement; and servicing special needs students. Specific assignments must be given to counselors, work experience coordinators and others that provide support services to the cluster teachers. Articulation of content and support services are essential for an exemplary delivery system.

Example questions for exploratory instructors and counselors are included as Appendices O_1 and O_2.

Develop Plans for Implementation

Goals and Objectives

After the needs assessment is complete, the proposed changes must be stated in goal and objective terms. Goals and objectives define "What is to be done". Each goal must be supported by clear, measurable objectives. A simple planning format is found as Appendix P.

Activities

For each objective, a sequential listing of activities must be developed to reach the objectives. Activities describe "How" the model will be developed and implemented.

Timelines

Timelines describe "When" activities should take place. These timeframes must be realistic and date specific to avoid floundering of efforts. Modifications of timelines are sometimes necessary to accommodate unforeseen delays but projects operate much smoother when activities are conducted within their planned timeframes.

Responsibility Agents

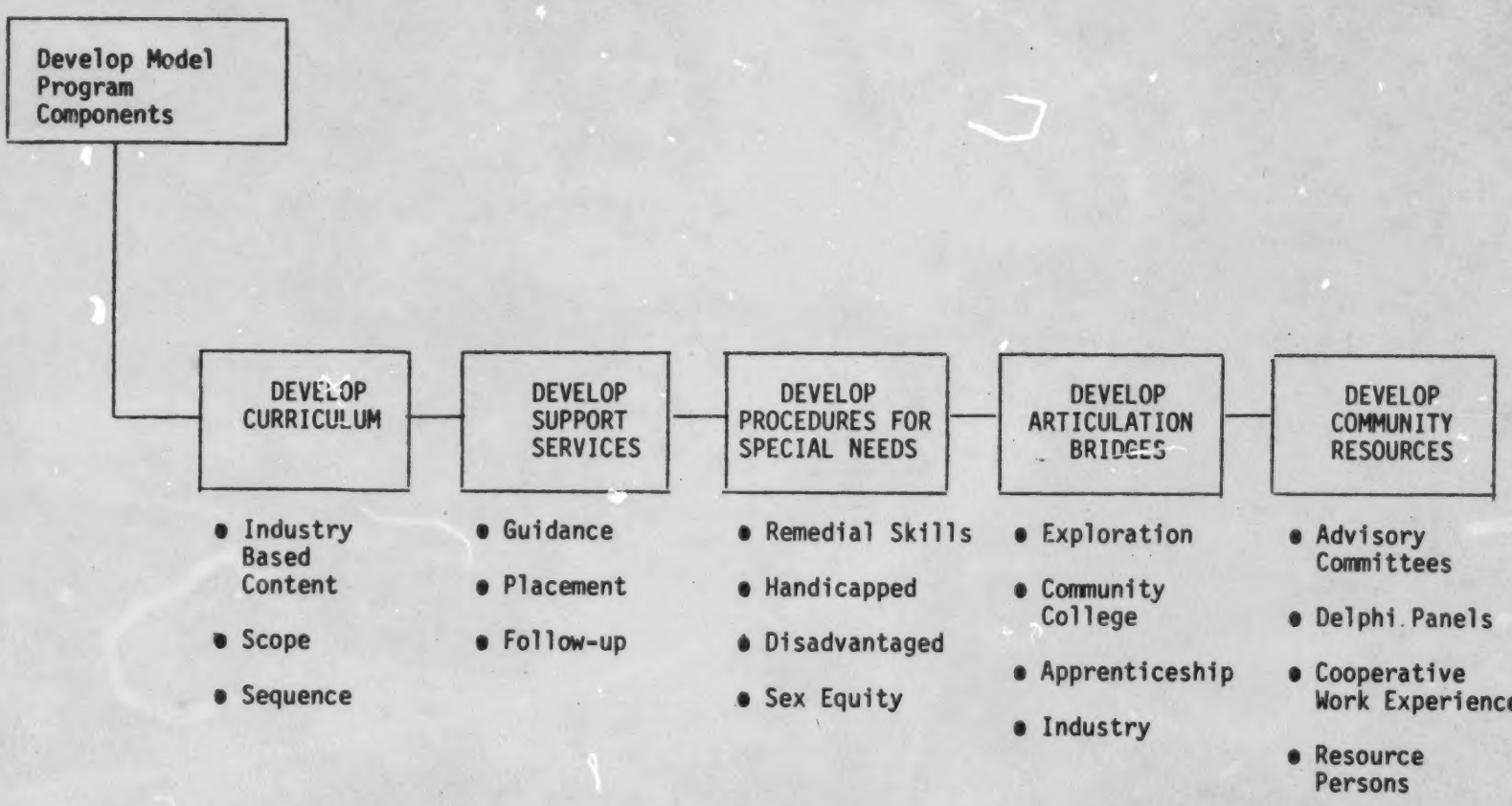
A responsibility agent must be identified for each objective and activity of the plan. "Who" will do the work? If everyone is responsible - no one is responsible. A clear identification of responsibility agents and expected outcomes will motivate staff to high level performance.

Long-Range Plans

In addition to the short range plans, a long range implementation plan is most helpful to those involved in program development. A 3 or 5-year plan allows components to be added each year until model status is reached. These long-range plans have been utilized by Oregon vocational educators for many years. The format for long-range plans are extremely simple. (See Appendix Q)

CHAPTER III

STEPS IN DEVELOPING MODEL CONSTRUCTION PROGRAM



CHAPTER III

DEVELOP MODEL PROGRAM COMPONENTS

Develop Curriculum

Industry Based Content

The management interviews and task inventory processes identify "What Should be" in a curriculum to provide entry level skills for program completers. A set of "core" competencies is defined by a value index based on the number of respondents using each task in the work place. Instructors respond to the same task listing according to their current instructional programs. This identifies "What is" in relation to job entry skills training. "What should be" minus "what is" identifies the gaps in curriculum content. Using the summaries for the current levels of instruction (Appendix M) and task inventory (Appendix L), the instructors and their advisory committees identify gaps, overlaps and emphasis areas for making curriculum modifications. These curriculum needs are summarized into a workable format by use of the matrices shown as Appendices R_1 and R_2.

Scope

An articulated curriculum must involve all levels of education that impact the program under consideration. Exploratory teachers in junior high and middle schools serve as building blocks for the secondary cluster programs. Industrial arts teachers introduce many concepts (i.e. safety) and processes (i.e. use of hand tools) that prepare students for entering a vocational class. A coordinated approach to curriculum development allows one level to support the efforts of the other levels. Employability becomes the goal and determines the scope of the curriculum with all levels of education making a contribution toward the end product.

Community college programs in construction should be articulated with the secondary effort so that students enjoy a smooth transition between the two levels. A skills card is an efficient way to communicate competency levels of students that move from secondary to community college programs. The secondary instructor signs off on skills proficiency and passes the card along to the community college. Advanced credit can be granted for skills mastered in high school. An example skills card is included as Appendix S.

Sequence

Many of the processes and concepts of construction are repeated at various grade levels. Consideration must be given to sequencing such activities to promote skill development and avoid unnecessary repetition of subject matter. An understanding between instructors on levels of proficiency desired at each level is critical to sound sequencing of skills. Is the objective to introduce a concept or have students perform the skill? The success of sequencing a curriculum is determined by instructor willingness to cooperate and congruence of individual philosophies. All levels must be involved in planning the sequence of instruction.

A scope and sequence outline for woods and construction in Beaverton School District is found as Appendix T. A full curriculum guide was developed and implemented into the Beaverton construction cluster. The size of this guide will not permit it to be included as the Adopter's Guide.

Develop Support Services

Guidance

If an articulated curriculum is to succeed, a strong guidance component must be present. Counselors must be aware of the sequential steps for developing construction skills and offer guidance for those students that can benefit from such training. This necessitates that the counselors become involved with program development in order to understand its specific needs.

Counselors should be charged with defining the routings of students from Industrial Arts classes to the construction cluster; from high school to community college and apprenticeship; and from junior high to high school. Each level must understand, respect and support the efforts of other levels.

The goals and activities of Beaverton's counselors in providing improved guidance services are included as Appendix U.

Placement

Although few secondary districts have formal placement services, many do provide some help to graduates in finding jobs. The placement component is very important to the completers of a construction program. Effort should be directed toward helping graduates in a next-step to a job or further training. The placement function can be strengthened by:

1) Identifying placement assistance now being rendered.
2) Define what should be provided.
3) Examine the feasibility of developing or improving placement services.
4) Organize placement services (regardless of scope) so that both students and staff understand what is available.

Appendix U contains the goals and activities for placement of graduates.

Follow-up

The only measure of effectiveness of vocational programs is a follow-up of graduates and their employers. Their success on the job is dependent on the quality of training received. Many formal and informal procedures are used for collecting follow-up data. The most common procedure is to conduct a questionnaire survey of former students and their employers.

A double-returnable postcard follow-up allows graduates to make quick response to a survey. This postcard is mailed out to graduates of the past year or after 3 or 5 years. A composite of the returns will identify the strengths, weaknesses and needs of a vocational program.

A sample postcard follow-up is provided as Appendix V.

Develop Articulation Bridges

Apprenticeship

Counselors and instructors should become acquainted with the apprenticeship opportunities and requirements for the key occupations of the construction trades. Strategies must be implemented to assure that direct contact with the Apprenticeship Center does occur and that a working relationship is established between the school and apprenticeship programs.

Apprenticeship information should be provided to students through normal counseling procedures and by having the apprenticeship representatives come to schools as resource persons to explain their programs. Procedures for entering apprenticeship programs must be clearly defined and made available to students.

The counselors of Beaverton School District defined a process for moving students from high school into apprenticeship. This process is shown in Appendix U.

Industry

Articulation with the construction industry is accomplished through many avenues. The local advisory committee is one excellent way to maintain contact with the industry. The committee members, if properly utilized, serve as a sounding board and public relations staff in the industry. Beyond the advisory committee, the instructor should have a method for keeping the industry informed about the program and to obtain feedback on technological changes. A newsletter to industry; membership on building associations; use of industry on Delphi review panels; resource persons for classroom; and personal visitations to construction firms are viable options for articulating with industry.

Exploratory Programs

The construction instructor should maintain a close relationship with the programs that serve as feeders to the 11th and 12th grade

curriculum. Junior high school counselors and industrial arts teachers (grades 7 - 10) have considerable influence on the quality of the construction program. They prepare and guide students toward classes that will continue to build on their own teaching efforts.

Beyond the special efforts to establish an articulated curriculum, strategies must be employed to keep the two levels in a framework that allow close cooperation and coordination of effort. A product of such effort is shown in Appendix T.

Community College

Articulation with local community college programs is enhanced by inviting the post-secondary instructor to serve on the high school advisory committee. Likewise, the high school instructor may have an opportunity to serve on the community college advisory committee. Either way offers instructors the opportunity to share ideas and gain understanding of the other's program. Community college instructors should be involved in curriculum revision projects of the high school. They are beneficial as a resource and will gain insight into competency levels of the graduates. Once the proficiency levels are established, advanced credit can be granted for skills learned in high school.

An instrument for communicating skills completion and levels of proficiency between high school and community college must be utilized. An example of a skills card is shown in Appendix S.

Develop Procedures for Serving Special Needs

Remedial Skills

Mathematics and English can become limiting to success in a construction cluster. Interdisciplinary approaches should be examined as a way to assist students in meeting the requirements of a construction program.

A system for providing remedial math and English must be defined and responsibility agents designated to assure that it happens. What is the responsibility of the instructor for mathematics and English? What is the responsibility of the mathematics and English departments for providing job-related instruction?

Objectives and activities for providing remedial instruction in the Beaverton School District is included as Appendix W.

Handicapped

Physical requirements such as lifting and climbing limit some types of handicapped students from entering the construction trades. Other types of handicapping conditions can succeed in a construction program if minor modifications are made in instructional strategies and program access.

To effectively serve the needs of the handicapped, the instructor must:

1) Identify physical limitations for specific jobs.
2) Identify intellectual and motor skill requirements for each job.
3) Make program modifications that will allow access by handicapped.
4) Implement teaching strategies that will allow them to succeed in the program.

Beaverton has defined strategies for serving the handicapped student in the construction cluster. These strategies are found in Appendix W.

Disadvantaged

Disadvantaged students require a special instructional approach. A cooperative effort of instructor, resource room teacher and cooperative work experience coordinator is needed to create this special approach.

Specifics on serving the disadvantaged student is found in Appendix W.

Sex Equity

Traditionally, construction has been a male-oriented industry. As females move into non-traditional roles, construction programs must encourage women to enroll and complete training as carpenters, masons, painters, etc. Some constraints are created by parental attitudes, peer acceptance and traditional role models. Other constraints can be

affected by the instructor and support staff of a school. The instructor should identify the limitations and barriers to women in the key occupations of construction and the potential for a woman to succeed in each type of work. Career ladders for women in the trades should be defined by counselors and instructional staff.

Schools can assist young women by removing scheduling barriers that prohibit them from enrolling in a traditionally male class. Promotional literature that explains career possibilities for women in construction should be shared with girls and their parents. Every effort should be made to expand the career choices of women. These choices should reflect honest appraisals of career opportunitites and be free of sex bias and sex-role stereotyping.

Beaverton staff have examined (in depth) the sex equity issues of the construction cluster. Their findings are shown in Appendix X.

Develop Community Resources

Advisory Committee

An advisory committee is a necessity for developing an industry-based curriculum. The members should represent a good cross-section of the construction trades and working levels of industry. The commitee should be actively involved in validating the skills to be included in the curriculum; helping the instructor secure resources for the program; and communicating the program objectives to others in the business and industry sectors. A list of Beaverton School District advisory committee members is shown as Appendix B.

Delphi Panels

Many people in industry are willing to assist schools as individuals but do not care for meetings. When conducting a task inventory or task analysis, these people will respond to mailings or phone inquiries. The Delphi technique allows us to collect many individual responses and to arrive at a consensus based on those responses. This technique is an efficient method to determine a true consensus. Meetings often yield a consensus based on the opinions of the strong and/or vocal

leaders of the group. Delphi approaches save time and offer sound results.

Cooperative Work Experience

On-the-job experience offers realistic training for construction students. If this experience can be obtained as a cooperative effort between school and job, the learning is reinforced at both settings. An exemplary construction program will offer opportunitites for students to work in the community. This experience should be conducted under the guidelines of the regular CWE program in the school district. These guidelines for Beaverton School District are shown in Appendix Y.

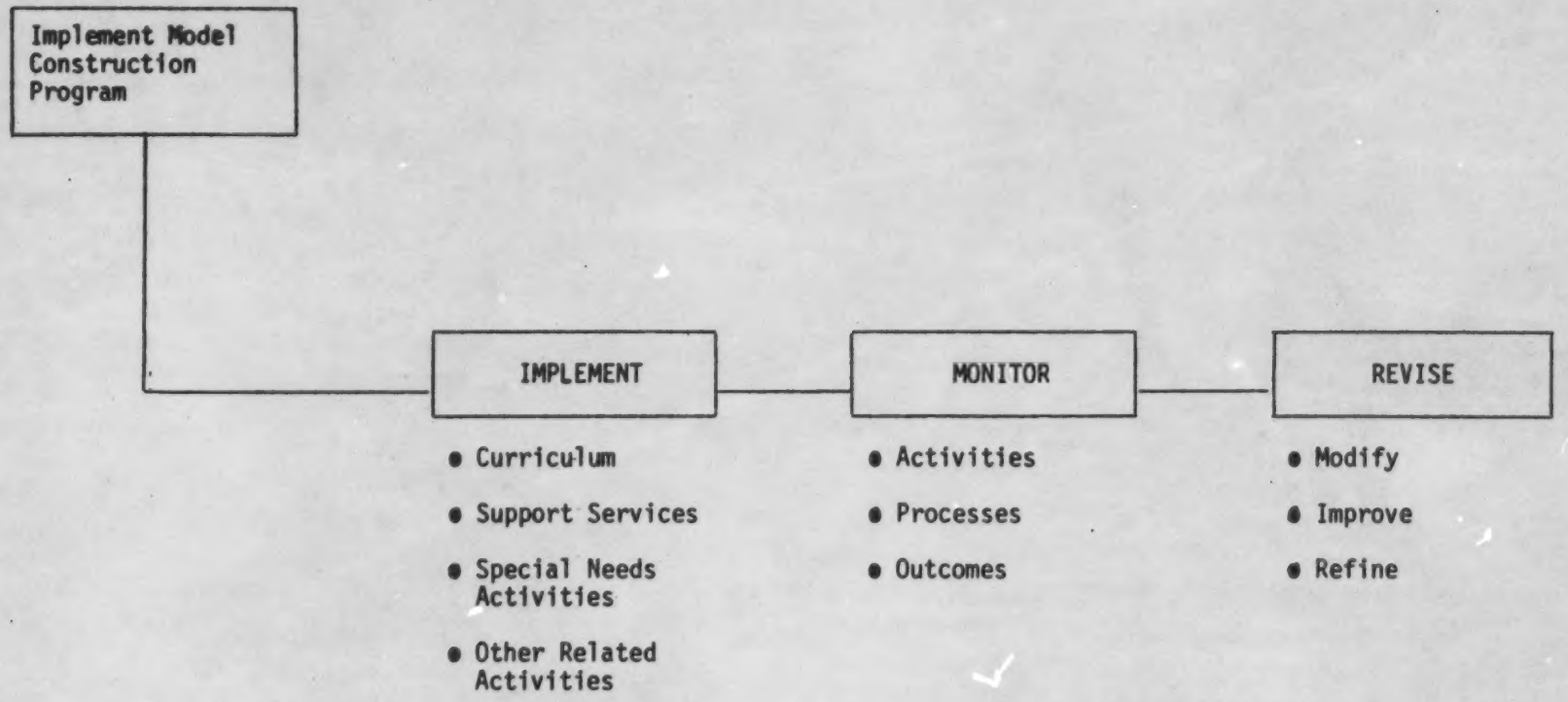
Resource Persons

Every community in Oregon has representatives of the construction trades in residence. These people have much to share in skills, knowledges and attitudes that drive the construction industry. Most of them are willing to share with students in the classroom or on a building site. Instructors should develop a quick-reference listing of willing resource people, categorized by occupational groups. A resource persons directory permits quick access to resource persons and allows the instructor to use them as appropriate to instructional needs.

In Beaverton all builders belong to the Washington County Builder's Association which has a directory of members. Beaverton School District utilizes the directory as a resource persons listing.

CHAPTER IV

STEPS IN IMPLEMENTING A MODEL PROGRAM



CHAPTER IV

IMPLEMENT MODEL CONSTRUCTION PROGRAM

Implement

Curriculum

A scope and sequence curriculum is derived from a task inventory of the skills, knowledges and attitudes needed for entry level into employment. A new program will encounter more problems in the implementation process than will an old, existing one. The industrial arts classes and the construction cluster class require only minor modifications of content and sequencing of curriculum. Actually, the changes must be defined as refinements or enhancements to the existing programs.

In most cases, this approach to curriculum development should not pose a threat to existing curriculum. Exceptions might be those programs that do not have a defined curriculum and are threatened by the prospect of having to develop one.

Emphasis should be given to the implementation of revised curriculum in:

1) Exploratory programs
2) Cluster programs

Support Services

The program support services should be implemented in concert with curriculum implementation. Counselors must adhere to the planned procedures and avoid slipping back to pre-project ways of doing things. Close attention must be given to the processes of guidance, placement and follow-up services that are reflected in their plans.

Special Needs Activities

Strategies and activities are designed to assist special needs populations. These populations include disadvantaged, handicapped, women in non-traditional roles and students with need for remedial instruction.

Once again, be cautioned that these strategies can only work if the plan is followed. Sometimes, a quality loss is experienced between planning and implementation of ideas. The touchstone of reality is a well-written plan with someone to monitor the outcomes and processes.

Other Related Activities

Some other entities help to make a successful program and must be, in a sense, implemented along with the curriculum.

Articulation efforts are an on-going process that makes curriculum flow smoothly from level to level. A tendency exists to halt articulation efforts once the curriculum is set in place. A special effort must be made to continue and strengthen linkages with other levels of education and industry.

Community resource development should continue beyond the program development phase. If the community element can be maintained at a high level, the vocational program and its instructor will remain current with existing technology. Updated programs are usually of high quality and their products are acceptable to the job market

Monitor the Implementation

Activities

A system of formative evaluation should be initiated for monitoring the activities of implementation. A simple form will allow the implementers to assess the quality of each activity. On-going modifications can and should be made on the basis of formative evaluation, rather than being made on attitudes, feelings and convenience. Where a number of instructors are involved in a project, an administrator or supervisor

should collect and analyze formative evaluation data and recommend modifications to program. An evaluation form for collecting participant evaluation of activities is included as Appendix Z. Examples of activities that deserve evaluation are advisory committee meetings, curriculum meetings, steering committee meetings and other group involvements.

Processes

During the implementation phase the processes utilized are most important to success. Process evaluation is part of the formative evaluation instrument. Processes were pre-defined in the original plans or proposal. Formative evaluation should determine whether the planned processes were utilized and, if so, the degree of success of specific processes. Examples of processes that should be monitored are approaches to curriculum delivery, processes for serving special needs populations and processes for elimination of sex role stereotyping.

Outcomes

Evaluation of outcomes can be accomplished by both formative and summative methods. Products should be evaluated by formative methods during the time they are being developed. Summative evaluation can be conducted on the completed product but it is usually too late to make corrections.

The major products of a vocational program are the students. Follow-up data on the students is a handy tool for monitoring the implementation process.

Revise

Modify

Program modifications should not be made on whim. Formative evaluation data should substantiate the need for modification before it is attempted. Without a control mechanism such as formative evaluation, a program and its curriculum risks "splintering" into many fragmented

and unrelated parts. Therefore, modifications must be carefully assessed before the change is made.

During the implementation of new components, on-going modifications are appropriate and recommended. The adopter is cautioned to base those modifications on "hard evidence" rather than "gut level" intuition.

Improve

Improvements can occur without modifications taking place. Most plans are full of enhancements and refinements that never seem to be fully implemented because of time restrictions. A project monitor should continue to surface these improvement strategies and encourage them as minor revisions to the existing programs. Improvement practices often occur in small or subtle practices but will give high payoff in program quality.

Refine

Refinements come with the "fine tuning" of a program. When all major components are in place and functioning, the program is ready for the refinements. Some refinements occur gradually as the instructor gains more experience with the subject matter. Other refinements arrive as a promising practice from another program. Examples of refinements might include development of transparencies for presenting subject matter; construction of models in laboratory; or improving training plans for CWE. Refinements are the "frosting on the cake" and should be encouraged. They improve teacher morale and bring enthusiasm to the program.

CHAPTER V

RESOURCES FOR A MODEL PROGRAM

Visitations to Exemplary Programs

For a district that is considering improvement of an existing construction program or implementation of a new one, the planners should visit several exemplary programs. Visitations are the fastest means for collecting ideas and information about construction programs. Examine both positive and negative features of programs; borrow good ideas from the site visited; and save time in your own developmental activities. Adoption and adaptation of program features is an economical method for starting new programs or components of programs.

Six construction programs have been listed, in addition to the Beaverton model, as good places to visit and observe programs in operation. Each of the programs have unique features or approaches to the delivery of instruction.

Benson Polytechnic High School
546 NE 12th Avenue
Portland, Oregon 97232
Telephone: 233-5891
Contact: Ak. Nishamuri
Vocational Administrator

- Coordinate house project with Portland Redevelopment Corporation who supplies building sites and materials, sell house
- 3-year-program
- Individualized Modules
- Large VICA Club
- Effective use of Advisory Committee

Aloha High School
SW 185th and Kinnaman Rd.
Beaverton, Oregon 97005
Telephone: 649-0465
Contact: Ken Box
Vocational Administrator

- Multidiscipline involvement in planning construction and marketing of a house. Home Ec, marketing, office education
- Coordinate building project with Board of Realtors
- All students involved with house building project are eligible for a scholarship from profits on house

Sabin Occupational Skills Center
14211 SE Johnson Road
Milwaukie, Oregon 97222
Telephone: 653-3812
Contact: Dr. Jack McPherson
Vocational Administrator

- Serve students from 3 different high schools

Lebanon Union High School
South 5th Street
Lebanon, Oregon 97355
Telephone: 451-1250
Contact: Don Carroll
Vocational Administrator

- Have two houses under construction each year to help avoid the weather problems and allow orderly and timely sequencing of instruction.

Phoenix High School
P. O. Box 697
Phoenix, Oregon 97535
Telphone: 535-1526
Contact: Ed Murray
Vocational Administrator

- Excellent small school program
- Advisory Committee serves as a non-profit corporation
- Provide scholarships from profits

Astoria High School
1001 W. Marine Drive
Astoria, Oregon 97103
Telephone: 325-3911
Contact: Rolland Johnson
Principal

- Use modular construction approaches

Agencies that can Provide Assistance

Oregon Department of Education
Salem

- Technical consultant for program and curriculum development

Oregon Department of Energy
Salem

- Source of energy-efficient construction techniques

Workmen's Compensation Board
Salem

- Industrial safety materials

Building Codes Division
Commerce Department
or City Building Official
Salem or Local

- Building code assistance

Fire Marshall's Office
or Local Fire Chief
Salem or Local

- Fire codes, enforcement, fire safety, demonstrations, lectures

Employment Division or Local Employment Offices Salem or Local	o Labor Market information
Associated General Contractors Portland	o Information on commercial building o Trends in building - local and national
Oregon Home Builders Association State or Local Office	o Information on home building industry
Associated Builders and Contractors Portland	o Information on commercial construction
American Federation of Labor	o Information on organized labor o Apprenticeship information o Local labor information o Resource persons o Advisory committee members
Metro Building Trades Council or Local Trade Council Portland or Local	o Information o Resource resources o Advisory committee members
Association of Business, Labor and Education Portland	o Resource persons o Field trips
Bureau of Labor-Apprenticeship and Training Information	o Apprenticeship information

REFERENCES

Carpentry Performance Objectives, Gerald F. Day, Maryland State Department of Education 1976

Residential Carpentry, Mortimer Reed, John Wiley and Sons, New York 1978

Commercial Carpentry - Instructional Units, Donald Diehl, Wayman Penner and revised by L. J. Hendrix, State Department of Vocational and Technical Education, Stillwater, Oklahoma 1978

Curriculum Guide for Building Construction, Oregon Board of Education 1972

Construction Industry Series, Texas Education Agency, Austin, Texas 1979

APPENDICES

A Steering Committee Roster

B Advisory Committee Roster

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I Task Inventory Checklist (Format)

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L_2 Validated Tasks/Core Competencies in Construction

M Summary of Current Levels of Instruction

N Summary of Appropriate Levels of Instruction

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P Plan Sheet - Short Range (Format)

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T Scope and Sequence Summary (Grades 7-12)

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W Guidelines for Serving Disadvantaged and Handicapped

X Guidelines for Sex Equity

Y Guidelines for Cooperative Work Experience

Z Form for Collecting Formative Evaluation Data

APPENDIX A

MODEL CONSTRUCTION CLUSTER PROJECT STEERING COMMITTEE

Susan Eilertsen, Beaverton High School, Curriculum Vice Principal

Gloria Gibbs, Beaverton High School, Language Arts Department Chairperson

Ken Kline, Beaverton High School, Construction Teacher

Ralph Powell, Beaverton High School, Industrial Arts Department Chairperson

Tom Morris, Beaverton High School, Guidance Vice Principal

Steve Davies, Highland Park Intermediate School, Industrial Arts Teacher

John Corey, Highland Park Intermediate School, Curriculum Vice Principal

Hal Lapp, Whitford Intermediate School, Curriculum Vice Principal

Don Stevens, Whitford Intermediate School, Industrial Arts Teacher

Chuck Steury, Special Education Teacher

Ken Box, Curriculum Specialist

APPENDIX B

CONSTRUCTION CLUSTER ADVISORY COMMITTEE

1981-82

MEMBERS

Dennis Arlt
Cabinet Maker
3520 S. E. Bradley Court
Hillsboro, Oregon 97123
648-0920

Brock Branan
Brock Branan and Associates
12525 S. W. 2nd
Beaverton, Oregon 97005
643-6451

Walt Nilson
Instructor
Portland Community College
12000 S. W. 49th Street
Portland, Oregon 97219
(Rock Creek Campus)
645-4461

John Kennedy
Kennedy Plumbing, Inc.
13985 S. W. Farmington Road
Beaverton, Oregon 97005
643-5535

Ed Morlan
U. S. Department of Labor, B.A.T.
1220 S. W. 3rd F.B. 840
Portland, Oregon 97204
221-3177

Don Plumbo
Former Student
11875 S. W. Baker
Beaverton, Oregon 97005
No #

Dave Sanchez
Northwest Building Institute
5410 S. W. Dover Lane
Portland, Oregon 97225
244-8266

Jim Hendryx
Beaverton Planning Department
4950 S. W. Hall
Beaverton, Oregon 97005
644-2191

Paul Reiter
Journeyman Electrician
14675 S. W. Forest Drive
Beaverton, Oregon 97007
644-6757

Paul Salmeri
Sheetrock
9850 S. W. Bonnie Brae Drive
Beaverton, Oregon 97005
643-6363

Randall Cobb
Anchor Refrigeration and Heating
Box 5097
Aloha, Oregon 97007
649-4235

APPENDIX C

COORDINATING COMMITTEES

Industrial Arts Curriculum Development

Ed Korver, Highland Park Intermediate School
Will Thomas, Cedar Park Intermediate School
Wayne Estvold, Sunset High School
Don Lary, Meadow Park Intermediate School
Wayne Bridges, Five Oaks Intermediate School
Ralph Powell, Beaverton High School
Ken Kline, Beaverton High School

Guidance Committee

Tom Morris, Guidance Vice Principal, Beaverton High School
Carol Warren, Counselor, Highland Park Intermediate School
Margery Mandel, Counselor, Whitford Intermediate School

Cluster Curriculum Review Committee

Ken Kline, Beaverton High School
David Howard, Aloha High School
Wayne Estvold, Sunset High School

APPENDIX D

LIBRARY INFORMATION RETRIEVAL SERVICE

1. WHAT IS THE LIBRARY INFORMATION RETRIEVAL SERVICE?

   LIRS, a division of the OSU Library, provides on-line bibliographic searching through remote access terminals. These terminals connect with information retailers like Lockheed Information Systems and Systems Development Corporation.

2. WHO USES LIRS?

   OSU faculty, research staff, students, and people with courtesy appointments. Other academic requesters (non-OSU) utilize the service as do non-academic patrons.

3. WHAT DO I SEARCH?

   LIRS directly retrieves information from a number of indexes and directories (i.e. Psychological Abstracts, Biological Abstracts, etc.) programmed for retrieval by computer. These data bases cover agriculture, the biological sciences, business, chemistry, education, engineering, the earth sciences, physics, psychology, and the social sciences.

4. WHAT ARE THE ADVANTAGES OF A COMPUTER SEARCH?

   *specificity and comprehensiveness: through text-searching and Boolean logic, the searcher may specify search parameters by coordinating subjects, authors, time periods to be covered, etc.

   *interaction: direct access to data bases allows the search to interact with the system to augment or alter the search strategy.

   *immediate retrieval of information: a typical search may take from 10-20 minutes, as opposed to a number of days of equivalent manual searching.

5. WHAT DO I RECEIVE?

   A computer-produced bibliography, not the original documents. Citations can be displayed in various formats on-line, or printed off-line at considerable savings. The latter reach you approximately one week after the search. Abstracts are only available in a few bases.

6. HOW CURRENT IS THE INFORMATION I RECIEVE?

   This depends on the data base. Most cover only the last 4-5 years of the literature.

7. WHAT SERVICES DOES LIRS PROVIDE?

*Searches on Demand: search consultants will work with requesters to prepare a search on a particular topic. The search may be comprehensive or specific, and it may involve several data bases, depending on the nature of the request.

*Current Awareness: the LIRS staff can assist the requester in preparing a search profile which can be run each time the data base is updated. This assures the requester of a relevant and timely bibliography of material in his/her field of interest.

8. HOW DO I INITIATE A SEARCH?

Obtain an LIRS information packet or search request form from the LIRS office, or one of the reference desks. Make an appointment with one of the search consultants by phoning 754-2249 or by completing the enclosed appointment card. Leave the card at the LIRS office (Rm 420) or at one of the reference desks, and a consultant will contact you.

9. HOW LONG WILL IT TAKE?

Generally an appointment may be made in 1 to 2 days. Appointments are scheduled for 1 hour, allowing enough time to discuss and prepare the strategy and run the search.

10. DO I NEED TO BE PRESENT?

It is often helpful to be present for the search to take advantage of the interactive nature of the data bases. A search can be run in absentia however.

11. HOW MUCH DOES IT COST?

Most searches run between $10-$30. Charges vary depending on the per minute charges for the data base ($0.13-$3.00), the time it takes to run the search (1 minute to over 20 minutes), and the number of citations printed (from less than 10 to more than 1,000).

12. WHAT ARE THE BILLING RATES?

*OSU and OSSHE (Oregon State System of Higher Education) students and faculty are charged for actual search time (computer and communications charges) and for printing costs. All other academic (private colleges, community colleges and public school systems, etc.) faculty and administrators are also direct costs.

*Non-academic patrons are charged a 15¢ surcharge on the direct costs and a $10/hr charge for strategy formulation and search time.

*Occasionally the library will have money available to aid in funding a search. Ask the search consultant about the special funds.

13. HOW DO I PAY FOR A SEARCH?

If you use an account number, include it on the search request form. Your department will receive a statement at the end of the month. LIRS uses all OSSHE account numbers. Cash payments are handled by the Library Photocopy Room. Payment is made either when the search is run or the off-line prints arrive. If you need a copy of the bill, Photocopy can make a copy of the search request form for you.

APPENDIX E

Steps in Sample Identification

1. Contact OOICC and request assistance in identifying a valid representative sample of industries and occupations that are being considered in the development of instructional programs. Call 378-8146.
2. OOICC will either recommend a sampling plan or refer you to specific contacts in the Employment Division. Be prepared to discuss sample in terms of DOT, OES or SIC codes for occupations and industries. The Dictionary of Occupational Titles (DOT) and Standard Industrial Codes (SIC) are available in community college libraries. The Oregon Employment Statistics Dictionary (OES) is available from the Employment Division. Call or write Ed Bissell, Research and Statistics, Employment Division, 875 Union Street N.E., Salem, Oregon 97311 (Telephone 378-8650) for OES information. An example of sample classification is found in Appendix F.
3. Based on staff availability, identify sample size to be interviewed on-site or through mail survey.
4. OOICC may help to identify actual sample or will identify sample groupings and numbers of firms to be contacted from each OES or SIC class. Select 30% alternates when identifying sample.
5. The Directory of Oregon Manufacturers (available in most libraries) has names, addresses, number of employees and contact persons for technical industries in Oregon. For non-technical areas, planners may need to resort to yellow pages or other information sources to specifically identify sample.

6. Develop a listing of firms to be interviewed and/or surveyed by mail. The listing should include firm name, address, contact person and telephone numbers.
7. Call firm; explain need for their cooperation; verify that they do employ persons in designated classes; arrange for management interviews; and verify location and contact persons for firm.
8. Revise sampling plan based on responses from industry as to their willingness to cooperate with survey.

APPENDIX F

INDUSTRY SAMPLE

Dictionary of Occupational Title Classification

Sample No.	DOT No.	DOT Name
1	860.381.026	Carpenter
2	844.884.014	Cement Mason
3	864.481.010	Floor Layer
4	840.781.010	Painter
5	826.381.074	Plumber, Residential
6	866.381.010	Roofer
7	801.781.010	Structural Ironworker

Standard Industrial Classification

Sample Code	SIC No.	SIC Name
1	1520	General Building Contractors - Residential
2	1530	Operative Builders
3	1540	General Contractors - Industrial Building and Warehouses
4	1710	Plumbing, Heating (Except Electric) and Air Conditioning
5	1720	Painting, Paperhanging and Decorating
6	1740	Masonry, Stonework, Tilesetting and Plastering
7	1750	Carpentering and Flooring
8	1760	Roofing and Sheet Metal Work
9	1770	Concrete Work
10	5030	Lumber and Other Construction Materials (Wholesale)
11	5070	Hardware, Plumbing and Heating Equipment and Supplies
12	5210	Lumber and Other Building Material Details (Retail
13	7340	Services to Dwellings and Other Buildings
14	9530	Administration of Housing Programs

APPENDIX G

No. _____

MANAGEMENT INTERVIEW GUIDE

1. What job titles (construction) are represented in your firm? (Check job titles against OES Code list. List local job titles and OES titles.)

2. How many employees in <u>your</u> firm have previous training in construction?

3. Which of the job titles require preparation training for job entry?

4. Which positions require training for job advancement and/or retention?

5. Where have most of your current employees received their training?

OJT _____	In-State _____
Apprenticeship _____	Out-of-State _____
High School _____	Family Training _____
Community College _____	Other _____
Tech Trade School _____	

6. What specific technical skills seem to be missing in the people that come to work for your firm?

7. What related skills and knowledges are most necessary for successful employment in your firm?

Read _____	Speak _____	Other _____
Write _____	Listen _____	_____
Analyze _____	Compute _____	_____

8. What personal traits are most important for successful employment in your firm?

Honesty _____	Safe Working Attitude _____
Punctuality _____	Other: (Please Specify) _____
Getting Along with Others _____	_____
Responsibility _____	_____

9. To what extent does your firm offer training programs for continuous updating and upgrading for employee skills?

10. If Beaverton High School develops an industry-based curriculum in construction, would your firm be willing to hire qualified graduates of such a program? Identify restrictions and constraints.

    a. Would you hire handicapped workers?

    b. Would you hire women?

11. What types of preparation training should be emphasized in a high school program?

    Technical Skills _____
    Related Skills (i.e. drafting) _____
    Other: _____
    _____

12. What are the end products of your firm?

13. Does your "crystal ball" foresee new and emerging technologies in construction that should be included in a program?

    a. Materials

    b. Equipment

    c. Energy

14. Will this result in new jobs being created? If yes, describe the new jobs.

15. Would you be interested in providing further assistance toward the development of an industry-based curriculum in construction for Beaverton School District? If Yes, specify:

- Allow employee to respond to task inventory _____
- Advisory group to verify skills to be taught in curruclum _____
- Assist with a task analyses by mail (Delphi) _____
- Provide observation site for student _____
- Provide a work experience site _____
- Provide resource persons for school or at work site _____

APPENDIX H

Daily Schedule

Oral Interviews of Industry

			Telephone
9:00 a.m.	16	Mr. Jack Ross Plasterers, Apprenticeship 2215 S. E. Division Portland, OR 97202	232-3257
11:00 a.m.	17	Mr. Don Perman 2730 N. E. Flanders Portland, OR 97232 Sheetmetal, Apprenticeship	231-4950
1:00 p.m.	18	Mr. Gary Reid Gary Reid, Inc. 12700 S. W. 72nd Tigard, OR 97223	620-3521
2:30 p.m.	19	Mr. Robert Mandish Columbia Custom Homes, Inc. 9550 S. W. Beaverton-Hillsdale Highway P. O. Box 1128 Beaverton, OR 97005	644-7610
4:00 p.m.	21	Mr. Gheen Abbott Insulation Applicators, Inc. 15065 S. E. 74th Tigard, OR 97223	620-5030
Alternate	22	Mr. Bob Hall, Financial Secretary/Business Manager Local 48, IBEW 2032 Lloyd Center Portland, OR 97232	284-4805

APPENDIX 1

TASK INVENTORY CHECKLIST

NO. _____

LISTED BELOW ARE THE DUTIES AND TASKS THAT ARE COMMONLY PERFORMED IN THE FIELD OF CONSTRUCTION. PLEASE CHECK THOSE TASKS THAT ARE NEEDED BY THE EMPLOYEES OF YOUR FIRM. ADD ANY TASKS WHICH MAY BE MISSING FROM THIS INVENTORY. BLANK SPACES ARE PROVIDED FOR WRITE-INS.	CHECK	COMMENTS
A. Practice Accident and Safety Prevention		
1. Protective Clothing and Equipment		
2. Lifting and Carrying		
3. Electric Power Tools		
4. Pneumatic Tools and Equipment		
5. Ladders		
6. Scaffolds		
7. Eye Protection		
8. Fumes, Dusts and Gases		
9. Materials Handling		
10. First Aid Training		
B. Read & Interpret Blueprints, Drawings & Job		
Specifications		
1. Blueprints		
a. Plot Plans		
b. Foundation Plans		
c. Floor Plans		
d. Elevation Plans		
e. Structural Plans		
f. Heating, Ventilating & Air Conditioning		
Plans		
g. Plumbing Plans		
h. Electrical Plans		

COMPUTER ANALYSIS OF TASK INVENTORY

1. Call OSU Computer Center (754-3474) for an appointment with a computer consultant.
2. Number completed task inventories by coding for D.O.T. Number and SIC Number.

   Example: See Appendix F for understanding the origin of the sampling coding. For instance, respondent #36 (John Doe) works as an D.O.T. #2 (Cement Mason) for SIC Industry #9 (Services to Dwellings and Other Buildings). The coding for this man's task inventory is:

Respondent #	#	SIC GROUP	
36	9	9	or 36-2-9

3. Meet with computer consultant or arrange to send in task inventories by mail.
4. Explain that a tally of each task is desired. The tally must be by:
   a) SIC Code
   b) D.O.T. Code
   c) Total Sample
5. Have task inventory results placed on punch cards in the key punch room at OSU Computer Center. Keypunching costs 20¢ per card.
6. Computer consultant will center cards on computer and check results for validity of data.

7. Pick up or have computer printouts mailed to your school.
8. Review tally results, eliminating those tasks of low numerical value.
9. Design matrices for summarizing computer printouts by changing format of task inventory checklist to matrix of tasks versus D.O.T. on SIC groups.
10. Summarize computer printouts by SIC industries and D.O.T. code. This will identify specific skills used in different industry groupings. This information can be useful in designing instructional programs for industry.
11. Summarize results of total sample by listing numbers of responses for each task. This allows reader to gauge how much the task cuts across industries and occupations. This summary can be made on a blank task inventory.
12. Screen out tasks of doubtful value by making comparisons of summary matrices.

TASK ANALYSIS FORMAT APPENDIX K

Based on responses of supervisors and technicians of the Construction Industry in Oregon.

LISTED BELOW ARE THE DUTIES AND TASKS THAT ARE COMMONLY PERFORMED IN THE FIELD OF CONSTRUCTION. PLEASE CHECK THOSE TASKS THAT ARE NEEDED BY THE EMPLOYEES OF YOUR FIRM. COLUMNS ARE PROVIDED FOR IDENTIFYING WHETHER THE SKILL IS REQUIRED FOR ENTRY LEVEL OR CAN BE LEARNED ON THE JOB; LEVEL OF DIFFICULTY; AND FREQUENCY OF ITS USE IN YOUR FIRM.	Entry Level		Level of Difficulty			Frequency		
	Entry	On-The-Job	Easy	Moderate	Difficult	Small Amount	Average Amount	Great Amount
A. Practice Accident and Safety Prevention								
1. Protective Clothing and Equipment								
2. Lifting and Carrying								
3. Electric Power Tools								
4. Pneumatic Tools and Equipment								
5. Ladders								
6. Scaffolds								
7. Eye Protection								
8. Fumes, Dusts and Gases								
9. Materials Handling								
10. First Aid Training								
B. Read and Interpret Blueprints, Drawings and Job								
Specifications								
1. Blueprints								
a. Plot Plans								
b. Foundation Plans								
c. Floor Plans								
d. Elevation Plans								
e. Structural Plans								
f. Heating, Ventilating and Air Conditioning								
Plans								
g. Plumbing Plans								
h. Electrical Plans								

TASK INVENTORY SUMMARY

Beaverton Construction Project
February, 1981

By

Dictionary of Occupations Classification (D.O.T.)

x indicates that 1/3 or more of resondents marked the items as being performed in their jobs.

* indicates that item was written in by industry respondents and was not rated by total respondent group.

Value Index - shows the actual number of respondents that marked an item as being performed in their jobs.

Composite Marking - x for all items with 1/3 (14) or more of the total (42) respondents marking the item as being performed in their jobs.

Burr Fancher & Associates
5890 NW Primrose
Albany, Oregon 97321

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
A. Practice Accident and Safety Prevention												
1. Protective Clothing and Equipment	x	x		x	x	x	x	x	x		x	29
2. Lifting and Carrying	x	x	x	x	x	x	x	x	x	x	x	43
3. Electric Power Tools	x	x	x	x	x	x	x	x	x		x	37
4. Pneumatic Tools and Equipment	x				x	x	x	x	x		x	22
5. Ladders	x	x		x	x	x	x	x	x	x	x	40
6. Scaffolds	x	x		x	x	x	x	x	x	x	x	29
7. Eye Protection	x	x	x		x	x	x	x	x		x	30
8. Fumes, Dusts and Gases	x		x	x	x	x	x	x	x	x	x	29
9. Materials Handling	x	x	x	x	x	x	x	x	x	x	x	40
10. First Aid Training	x	x		x	x	x	x	x	x		x	33
B. Read & Interpret Blueprints, Drawings and Job Specifications												
1. Blueprints												
a. Plot Plans	x	x			x				x		x	20
b. Foundation Plans	x				x			x	x		x	21
c. Floor Plans	x	x	x	x	x			x	x		x	34

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
B. Read & Interpret Blueprints, Drawings & Job Specifications (Contd.)												
d. Elevation Plans	x	x			x	x		x	x		x	30
e. Structural Plans	x	x			x		x	x	x		x	26
f. Heating, Ventilating & Air Conditioning Plans	x				x			x	x		x	19
g. Plumbing Plans	x				x			x	x		x	19
h. Electrical Plans	x				x		x	x	x		x	19
i. Sprinkler Plans					x			x	x			9
j. Communications Plans: Telephone, Intercom					x			x	x		x	15
2. Read and Interpret Drawings												
a. Orthographic	x						x	x	x			13
b. Isometric	x				x			x	x		x	16
c. Oblique								x	x			8
d. Perspective	x							x	x			10
e. Sketches	x	x	x		x		x	x	x		x	23
3. Job Specifications												
a. General	x				x			x	x		x	22
b. Sheet Metal	x				x		x	x	x		x	15

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter 1	Cement Mason 2	Floor Layer 3	Painter 4	Plumber 5	Roofer 6	Structural Ironworker 7	Sheet Metal Worker 8	Electrical and Related Services 9	Insulation 10	COMPOSITE	INDEX VALUE
B. Read and Interpret Blueprints, Drawings and Job Specifications (Contd.)												
c. Plumbing	x				x			x	x		x	16
d. Electrical	x						x	x	x		x	14
e. Concrete	x	x							x			12
f. Masonry	x								x			10
g. Roofing	x					x		x	x			11
h. Welding							x	x	x			9
C. Measure, Mark and Layout Construction Projects												
1. Measure												
a. Folding Rule	x				x			x	x		x	16
b. Pull Out Tape	x	x	x		x		x	x	x	x	x	36
c. 100' Tape	x	x			x	x		x	x		x	31
d. Surveyor Chain	x								x			5
e. Rafter Square	x							x	x			11
f. Combination Square	x	x						x	x		x	18
g. Tri-Square	x							x	x		x	15

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
C. Measure, Mark and Layout Construction Projects (Contd.)												
2. Mark												
a. Rafter Square	x						x	x				9
b. Scriber	x		x				x	x				13
c. Divider and Trammel	x						x	x				7
d. Chalkline	x	x	x		x	x	x	x		x		26
e. Pencil and Marking Crayons	x	x	x		x		x	x		x		26
3. Layout												
a. Various Types of Levels	x	x	x		x		x	x		x		25
b. Surveying Instruments	x	x			x			x				12
c. Laser					x			x				6
D. Select and Use Materials, Tools, Equipment to Perform a Job												
MATERIALS:												
1. Acoustic Material	x											7
2. Adhesives: Glue, Cement, Epoxy, Etc.	x		x		x	x	x	x	x		x	23
3. Abrasives	x						x	x				12
4. Aggregates: Sand, Gravel, Crushed Rock, Etc.	x	x				x					x	14

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
D. Select and Use Materials, Tools, Equipment to Perform a Job (Contd.)												
5. Appliances: Ranges, Refrigerators, Dishwashers, Etc.	x								x			9
6. Asbestos Materials						x			x			7
7. Cabinets: Factory Built; Metal, Wood, Plastic	x		x					x	x			13
8. Caulking Materials	x		x		x	x			x		x	18
9. Conductors: Electric, Heat								x	x			8
10. Conduits and Conduit Fittings									x			5
11. Doors and Door Frames	x							x				9
12. Dry Wall Covering	x											5
13. Fasteners: Nails, Screws, Bolts, Staples, Heavy Timber Fasteners, Etc.	x	x	x		x	x	x	x	x	x	x	34
14. Fixtures: Lighting, Heating								x	x			10
15. Flooring Materials: Linoleum, Vinyl, Asphalt, Cork, Etc.			x									5
16. Glass and Glazing Supplies	x			x								6
17. Hardware: Hinges, Catches, Locks, Etc.	x							x	x			11
18. Heating Equipment: Furnaces, Boilers, Etc								x	x			10
19. Insulation: Building, Batts, Rolls, Etc.	x					x	x	x	x	x	x	16
20. Insulation, Electric: Tapes, Liquids, Etc									x			8

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
D. Select and Use Materials, Tools, Equipment to Perform a Job (Contd.)												
21. Lumber, Dimension	x	x						x	x		x	18
22. Lumber, Finish: Moulding, Siding, Etc.	x			x								11
23. Masonry Products: Brick, Concrete, Block, Fire Brick, Tile, Etc.	x	x										9
24. Mortar Ingredients: Lime, Portland Cement, Etc.	x	x							x			9
25. Metals: Sheets, Plates, Extruded, Angles, Hardware Cloth, Etc.	x						x	x	x			13
26. Paints and Finishes: Including Thinners and Cleaners	x			x			x	x				10
27. Panels, Electrical									x			6
28. Pipe and Pipe Fittings					x		x	x	x		x	16
29. Plaster and Plaster Materials												3
30. Plasterboard	x											5
31. Plastics: Wire, Cloth, Screen, Sheet, Tubing					x			x				9
32. Plastic Laminates	x		x		x							9
33. Plywood	x	x						x	x		x	14
34. Plumbing Fixtures					x							9
35. Pre-Cast Masonry Units	x	x										7
36. Reinforcing Materials: Mesh, Ties, Metal Lath, Rod, Etc.	x	x							x	x		13

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
D. Select and Use Materials, Tools, Equipment to Perform a Job (Contd.)												
37. Roofing Materials: Tar, Felt Paper, Shingles, Gutters, Downspouts, Flashing, Etc.	x				x	x		x			x	18
38. Ropes and Cables				x	x	x		x	x		x	15
39. Timber, Structured: Laminated	x											6
40. Water Proofing Materials	x	x			x	x	x	x	x		x	21
41. Welding Supplies, Arc					x			x	x			9
42. Welding Supplies, Gas					x		x	x	x			11
43. Welding Fuels (Gases)					x		x	x	x			10
44. Windows and Window Frames	x											10
TOOLS AND EQUIPMENT												
45. Air Compressors	x	x		x		x	x		x		x	21
46. Benders, Pipe and Conduit					x		x		x			12
47. Boring Tools, Hand (Wood): Hand Drills, Reamers	x				x		x	x	x		x	24
48. Buffers								x	x			8
49. Caulking Equipment	x			x	x	x		x	x	x	x	23
50. Concrete and Mortar Mixing Tools	x	x						x	x			13
51. Concrete Finishing Tools: Float, Darby, Etc.	x	x							x			9

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
D. Select and Use Materials, Tools, Equipment to Perform a Job (Contd.)												
52. Crane or Hoist (Small, Electric)								x	x			9
53 Cutting Machine (Sheetmetal)							x	x	x			12
54. Drill: Portable	x	x			x	x	x	x	x		x	30
55. Drill: Stationary							x	x	x			8
56. Electrical Hand Tools: Side Cutters, Pliers, Etc.	x		x				x	x	x		x	20
57. Fastening Tools: Hammers, Axes, Wrenches, Pliers, Screwdrivers, Nail Sets	x		x		x	x	x	x	x	x	x	30
58. Float: Power		x										4
59. Gas Torch or Furnace	x				x		x	x	x		x	16
60. Grinding Machines			x		x		x	x	x		x	14
61. Holding Tools: "C" Clamps, Bar Clamps, Vise, Pipe Clamps, Etc.	x				x		x	x	x		x	17
62. Impact Power Tools	x				x			x	x		x	15
63. Layout, Measuring, Marking and Checking Instruments: Transit, Plumb Bob, Tape, Etc	x	x			x			x	x		x	21
64. Motors, Gasoline								x	x			9
65. Nailing Machine	x					x			x			12
66. Oxy-Acetylene Welder					x		x	x	x			12
67. Painting and Finishing Equipment: Brushes, Rollers, Etc.	x			x			x	x	x			11

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
D. Select and Use Materials, Tools, Equipment to Perform a Job (Contd.)												
68. Planer (Surfacer): Wood	x											7
69. Polishing Tools, Power								x	x			5
70. Power Plane, Portable	x											4
71. Power Actuated Tools	x							x	x			13
72. Power Pipe Machine: Threading, Reaming, Cutting					x		x	x	x		x	18
73. Prying Tools: Nail Pullers, Wrecking Bars, Crow Bars, Etc.	x				x	x		x	x		x	23
74. Riveting Equipment							x	x	x			12
75. Router	x		x						x			12
76. Sanders	x		x	x					x		x	14
77. Saws: Band, Circular, Jig, Scroll, Skill, Radial Arm, Saber	x	x				x	x	x	x		x	27
78. Scraping Tools: Hand and Power	x			x		x			x			11
79. Sharp Edge Cutting Tools, Hand: Chisels, Star Drill, Countersink, Knives, Tin Snips	x	x				x	x	x	x	x	x	29
80. Soldering and Brazing Equipment	x				x		x	x	x		x	19
81. Spray Gun and Equipment				x		x		x				8
82. Staplers	x		x			x	x	x	x	x	x	20
83. Tooth Cutting Tools, Wood (Hand): Saws, Files, Rasps, Etc.	x		x		x	x	x	x	x	x	x	27

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
D. Select and Use Materials, Tools, Equipment to Perform a Job (Contd.)												
84. Tooth Cutting Tools, Metal (Hand): Saws, Files, Etc.	x							x	x		x	18
85. Tool Sharpening Equipment (Hand): Files, Oil Stones, Etc.	x						x	x	x	x	x	20
86. Transit	x	x			x			x	x		x	17
87. Trowels, Power		x										7
88. Welder	x				x		x	x	x			11
E. Select and Use Scaffolding and Rigging												
1. Identify Rope, Twine and Synthethic Slings and Fasteners					x			x	x			10
2. Calculate Weight Loads	x				x			x	x			13
3. Select Rigging to Handle Load	x				x	x		x	x			12
4. Select Lifting Device (Crane, Chain, Hoist, Rope Fall)					x	x	x	x	x		x	14
5. Use Safety Tag Lines	x				x			x	x		x	14
6. Use Various Types of Ladders	x			x	x	x	x	x	x	x	x	31
7. Rig Electric Swing Scaffolding							x	x				8
8. Rig Hand "Rope Falls" Swinging Scaffold							x	x				7
9. Dismantle Scaffolding	x	x			x	x		x	x	x	x	19
10. Clean and Store Scaffolding	x						x	x	x			13

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	1 Carpenter	2 Cemnt Mason	3 Floor Layer	4 Painter	5 Plumber	6 Roofer	7 Structural Ironworker	8 Sheet Metal Worker	9 Electrical and Related Services	10 Insulation	COMPOSITE	INDEX VALUE
E. Select and Use Scaffolding and Rigging (Contd.)												
11. Set up Tubular Scaffolding	x	x			x			x	x	x	x	21
F. Cut and Fit Materials												
1. Foundations and Sills	x											10
2. Floor and Ceiling Joists	x							x				10
3. Headers and Trimmers	x							x				12
4. Plywood and Wood Decking	x							x				10
5. Stair Stringers	x											8
6. Columns, Beams and Braces	x								x			10
7. Wall Studs and Plates	x							x				13
8. Blocking and Bracing in Walls	x				x			x	x			13
9. Plywood, Insulation Board, Gypsum Board Wall and Roof Sheathing	x					x		x	x	x	x	16
10. Rafters and Purlins for Roof	x											7
11. Trusses	x											8
12. Timbers, Glue Lams, Decking and Sheathing	x											8
13. Prefab Rock Deck System	x					x		x	x			10
14. Metal Studs	x								x			9

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
F. Cut and Fit Materials (Contd.)												
15. Wallboard	x											8
16. Suspended Ceiling	x								x			10
17. Stress Skin Panels												2
18. Plywood Box Beams	x											6
19. Folded Plate Roofs	x											3
20. Bridging	x											7
21. Sawhorses	x								x		x	14
22. Hangswing and Bifold Doors	x											8
23. Cabinets	x											8
24. Interior and Exterior Trim	x											8
25. Siding	x											9
26. Formica Type Materials	x		x									6
27. Marlite Type Materials												4
28. Acoustic Tile and Sheets												2
29. Overhead Garage Doors	x								x			7
30. Screen Doors	x								x			9

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)												
	1 Carpenter	2 Cement Mason	3 Floor Layer	4 Painter	5 Plumber	6 Roofer	7 Structural Ironworker	8 Sheet Metal Worker	9 Electrical and Related Services	10 Insulation	COMPOSITE	INDEX VALUE
F. Cut and Fit Materials (Contd.)												
31. Movable Partitions	x											4
32. Staircase and Handrails	x											8
33. Hardwood Floors	x											5
34. Wood and Plastic Gutters	x							x				5
35. Wall Paneling	x											7
36. Holes for Sinks and Appliances	x				x				x		x	14
37. Floor Covering	x		x									4
38. Vinyl Asbestos Tile			x									3
39. Rubber Base Floor Covering			x									3
40. Carpet Over Pad Floor Covering			x									3
41. Glue Down Carpet			x									3
42. Plastic Laminate Floor Covering												2
43. Structural Ironwork	x								x			7
44. Metal Sheathing								x				5
45. Reinforcing Steel	x								x			7
46. Ornamental Ironwork								x				4

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)												
	1 Carpenter	2 Cement Mason	3 Floor Layer	4 Painter	5 Plumber	6 Roofer	7 Structural Ironworker	8 Sheet Metal Worker	9 Electrical and Related Services	10 Insulation	COMPOSITE	INDEX VALUE
F. Cut and Fit Materials (Contd.)												
47. Water Lines	x				x				x			13
48. Drains and Sewers	x				x							13
49. Natural Gas Lines					x			x				10
50. Bathtubs, Sinks or Labatories					x							9
51. Showers, Faucets and Showerheads					x							9
52. Toilets and Urinals					x							9
53. Metal Flashing	x				x	x		x	x		x	23
54. 3 Tab Shingle	x					x						12
55. Dutch Lap and Other Shingles						x						7
56. Roll Roofing	x					x						10
57. Tile Roofing						x						6
58. Shake/Shingle Roofing	x					x		x				10
G. Fastener Materials												
1. Nails	x	x				x		x	x	x	x	26
2. Bolts	x				x			x	x		x	18
3. Screws	x				x	x	x	x	x		x	23

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
G. Fastener Materials (Contd.)												
4. Electric Arc Welding					x		x	x	x			10
5. Oxy-Acetylene Welding					x		x	x	x			11
6. Glues, Cements and Other Bonding Agents	x				x	x	x	x	x		x	20
7. Caulking Compounds	x				x	x		x	x		x	22
8. Sweat Copper Pipe Together	x				x		x	x	x		x	15
9. Solvent for Joining Plastic Pipe	x				x			x	x		x	16
10. Knots and Hitches	x								x			11
H. Finish Materials												
1. Sand Floors			x									4
2. Prepare Surfaces	x		x	x			x		x			13
3. Patch Cracks	x		x	x					x			13
4. Sandblast		x										5
5. Use Painting Equipment												
a. Brushes	x		x	x				x	x			11
b. Roller	x			x		x		x				9
c. Spray Gun				x		x		x				8

TASK INVENTORY STATEMENT

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)												
	1 Carpenter	2 Cement Mason	3 Floor Layer	4 Painter	5 Plumber	6 Roofer	7 Structural Ironworker	8 Sheet Metal Worker	9 Electrical and Related Services	10 Insulation	COMPOSITE	INDEX VALUE
H. Finish Materials (Contd.)												
6. Paint												
a. Interior	x			x								7
b. Exterior	x			x								7
c. Metal				x				x	x			10
d. Wood	x			x					x			7
e. Stucco				x								4
f. Cement				x								5
g. Plastic				x								4
h. Sheet Rock				x								5
7. Finish Concrete												
a. Place	x	x							x			10
b. Compact	x	x							x			10
c. Level	x	x							x			9
d. Edge	x	x							x			9
e. Float	x	x							x			9
f. Cure	x	x										7

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
H. Finish Materials (Contd.)												
g. Trowel	x	x							x			11
h. Broom Surface	x	x										8
i. Patch Surface	x	x										10
I. Calculate												
1. Add, Subtract, Multiply and Divide Whole Numbers	x	x	x	x	x	x		x	x	x	x	33
2. Fractions (Add, Subtract, Multiply and Divide)	x	x	x		x	x		x	x	x	x	31
3. Decimals	x	x	x		x	x		x	x	x	x	27
4. Conversion of Fracions to Decimals	x		x		x			x	x	x	x	23
5. Ratio and Proportion	x			x	x	x		x	x	x	x	21
6. Percentages	x	x	x		x			x	x	x	x	26
7. Area of Rectangles	x				x			x	x		x	20
8. Area of Circles	x		x		x			x	x		x	24
9. Volume of Rectangles	x		x		x			x	x		x	20
J. Perform Related Tasks												
1. Drive Pick Up Truck	x	x	x	x	x		x	x	x	x	x	34
2. Use Telephone and Teletype Equipment	x	x		x	x	x		x	x	x	x	21

TASK INVENTORY SUMMARY

DUTY AND TASK STATEMENTS	CLASSIFICATION CODES (D.O.T.)											
	Carpenter	Cement Mason	Floor Layer	Painter	Plumber	Roofer	Structural Ironworker	Sheet Metal Worker	Electrical and Related Services	Insulation	COMPOSITE	INDEX VALUE
	1	2	3	4	5	6	7	8	9	10		
J. Perform Related Tasks (Contd.)												
3. Read Handbooks, Catalogs and Manuals	x			x	x	x	x	x	x	x	x	29
4. Read Service Orders	x		x	x	x	x	x	x	x	x	x	30
5. Estimate Amounts and Cost of Materials	x	x	x	x	x	x		x	x	x	x	29
K. Demonstrate Personal Qualities												
1. Honesty	x	x	x	x	x	x	x	x	x	x	x	42
2. Punctual	x	x	x	x	x	x	x	x	x	x	x	41
3. Responsible	x	x	x	x	x	x	x	x	x	x	x	42
4. Safeworking Attitude	x	x	x	x		x	x	x	x	x	x	36
5. Follow Orders	x	x	x	x	x	x	x	x	x	x	x	42
6. Get Along With Others	x	x	x	x	x	x	x	x	x	x	x	42
7. Good Health Habits	x	x	x	x	x	x	x	x	x	x	x	41

APPENDIX L_2

VALIDATED TASKS/CORE COMPETENCIES

Tasks validated by task inventory of key occupations of construction trades. These validated tasks were considered entry level skills by over 1/3 of the respondents to the task inventory checklists.

	VALUE INDEX
A. Practice Accident and Safety Prevention	
1. Protective Clothing and Equipment	29
2. Lifting and Carrying	43
3. Electric Power Tools	37
4. Pneumatic Tools and Equipment	22
5. Ladders	40
6. Scaffolds	29
7. Eye Protection	30
8. Fumes, Dusts and Gases	29
9. Materials Handling	40
10. First Aid Training	33
B. Read & Interpret Blueprints, Drawings & Job Specifications	
1. Blueprints	
a. Plot Plans	20
b. Foundation Plans	21
c. Floor Plans	30
d. Elevation Plans	34
e. Structural Plans	26
f. Heating, Ventilating & Air Conditioning Plans	19
g. Plumbing Plans	19
h. Electrical Plans	19
2. Read and Interpret Drawings	
a. Isometric	16
b. Sketches	23
3. Job Specifications	
a. General	22
b. Sheet Metal	15
c. Plumbing	16
d. Electrical	14

C. Measure, Mark and Layout Construction Projects

1. Measure

a. Folding Rule	16
b. Pull Out Tape	36
c. 100' Tape	31
d. Combination Square	18
e. Tri-Square	15

2. Mark

a. Chalkline	26
b. Pencil and Marking Crayons	26

3. Layout

a. Various Types of Levels	25

D. Select and Use Materials, Tools, Equipment to Perform a Job

MATERIALS

1. Adhesives: Glue, Cement, Epoxy, Etc.	23
2. Aggregates: Sand, Gravel, Crushed Rock, Etc.	14
3. Caulking Materials	18
4. Fasteners: Nails, Screws, Bolts, Staples, Heavy Timber Fasteners, Etc.	34
5. Insulation: Building, Batts, Rolls, Etc.	16
6. Lumber, Dimension	18
7. Pipe and Pipe Fittings	16
8. Plywood	14
9. Roofing Materials: Tar, Felt Paper, Shingles, Gutters, Downspouts, Flashing, Etc.	18
10. Ropes and Cables	15
11. Water Proofing Materials	21

TOOLS AND EQUIPMENT

12. Air Compressors	21
13. Boring Tools, Hand (Wood): Hand Drills, Reamers	24
14. Caulking Equipment	23
15. Drill: Portable	30

TOOLS AND EQUIPMENT (Contd.)

16.	Electrical Hand Tools: Side Cutters, Pliers	20
17.	Fastening Tools: Hammers, Axes, Wrenches, Pliers, Screwdrivers, Nail Sets	30
18.	Gas Torch or Furnace	16
19.	Grinding Machines	14
20.	Holding Tools: "C" Clamps, Bar Clamps, Vise, Pipe Clamps, Etc.	17
21.	Impact Power Tools	15
22.	Layout, Measuring, Marking and Checking Instruments: Transit, Plumb Bob, Tape, Etc.	21
23.	Power Pipe Machine: Threading, Reaming, Cutting	18
24.	Prying Tools: Nail Pullers, Wrecking Bars, Crow Bars, Etc.	23
25.	Sanders	14
26.	Saws: Band, Circular, Jig, Scroll, Skill, Radial Arm, Saber	27
27.	Sharp Edge Cutting Tools, Hand: Chisels, Star Drill, Countersink, Knives, Tin Snips	29
28.	Soldering and Brazing Equipment	19
29.	Staplers	20
30.	Tooth Cutting Tools, Wood (Hand): Saws, Files, Rasps, Etc.	27
31.	Tooth Cutting Tools, Metal (Hand): Saws, Files, Etc.	18
32.	Tool Sharpening Equipment (Hand): Files, Oil Stones, Etc.	20
33.	Transit	17

E. Select and Use Scaffolding and Rigging

1.	Select Lifting Device (Crane, Chain Hoist, Rope Fall)	14
2.	Use Safety Tag Lines	14
3.	Use Various Types of Ladders	31
4.	Dismantle Scaffolding	19
5.	Set Up Tubular Scaffolding	21

F. Cut and Fit Materials

1.	Plywood, Insulation Board, Gypsum Board Wall and Roof Sheathing	16
2.	Sawhorses	14
3.	Holes for Sinks and Appliances	14
4.	Metal Flashing	23

G. Fastener Materials

1.	Nails	26
2.	Bolts	18
3.	Screws	23
4.	Glues, Cements and Other Bonding Agents	20
5.	Caulking Compounds	22
6.	Sweat Copper Pipe Together	15
7.	Solvent for Joining Plastic Pipe	16

H. Finish Materials

(No Finishing Tasks with Indexes for being included as Core Skills)

I. Calculate

1.	Add, Subtract, Multiply & Divide Whole Numbers	33
2.	Fractions (Add, Subtract, Multiply and Divide)	31
3.	Decimals	27
4.	Conversion of Fractions to Decimals	23
5.	Ratio and Proportion	21
6.	Percentages	26
7.	Area of Rectangles	20
8.	Area of Circles	24
9.	Volume of Rectangles	20

J. Perform Related Tasks

1.	Drive Pickup Truck	34
2.	Use Telephone and Teletype Equipment	21
3.	Read Handbooks, Catalogs and Manuals	29
4.	Read Service Orders	30

K. Demonstrate Personal Qualities

1.	Honesty	42
2.	Punctual	41
3.	Responsible	42
4.	Safeworking Attitude	36
5.	Follow Orders	42
6.	Get Along With Others	42
7.	Good Health Habits	41

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
A. Practice Accident and Safety Prevention									
1. Protective Clothing and Equipment	O X S	✓ W S X	✓ X S	X	*	* X	X	X	29
2. Lifting and Carrying	O X	X	X		*	* X	X	X	43
3. Electric Power Tools	O X S	✓ W S X	✓ X S	X	*	* X	X	X	37
4. Pneumatic Tools and Equipment					*	* X	X	X	22
5. Ladders	O X					X	X	X	40
6. Scaffolds						X	X	X	29
7. Eye Protection	O X S	✓ + W S X	✓ X S	X	*	* X	X	X	30
8. Fumes, Dusts and Gases	O X	X	X				X	X	29
9. Materials Handling	O X	X	X			X	X	X	40
10. First Aid Training							X	X	33
B. Read and Interpret Blueprints, Drawings and Job Specifications									
1. Blueprints									
a. Plot Plans					X	X	X	X	20
b. Foundation Plans					X	X	X	X	21
c. Floor Plans		D			X	X	X	X	31
d. Elevation Plans					X	X	X	X	30
e. Structural Plans						X	X	X	26
f. Heating, Ventilating and Air Conditioning Plans						X	X	X	19
g. Plumbing Plans					X	X	X	X	19

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
B. Read and Interpret Blueprints, Drawings and Job Specifications (Contd.)									
h. Electrical Plans					X		X	X	19
i. Sprinkler Plans							X		9
j. Communications Plans: Telephone, Intercom							X	X	15
2. Read and Interpret Drawings									
a. Orthographic	S	✓ D S	✓ S	X	*	*	X		13
b. Isometric		D					X	X	16
c. Oblique		D					X		8
d. Perspective		D			X	X	X		10
e. Sketches	S	✓ D S	✓ S	X	* X	* X	X	X	23
3. Job Specifications									
a. General	X	X	X		X	X	X	X	22
b. Sheet Metal	✓	✓	✓				X	X	15
c. Plumbing					X	X	X	X	16
d. Electrical					X	X	X	X	14
e. Concrete					X	X	X		12
f. Masonry					X		X		10
g. Roofing					X	X	X		11
h. Welding	✓ X	✓ X	✓ X				X		9
i. Finish Carpentry and Cabinetmaking					*	*			

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
C. Measure, Mark and Layout Construction Projects									
1. Measure									
a. Folding Rule							X	X	16
b. Pull Out Tape				X	*	* X	X	X	36
c. 100' Tape						X	X	X	31
d. Surveyor Chain							X		5
e. Rafter Square	S O	S	S			X	X		11
f. Combination Square	O X S	✓ W + Y S	✓ X S	X	*	* X	X	X	18
g. Tri-Square	O X S	✓ W + Y S	✓ X S	X	*	* X		X	15
2. Mark									
a. Rafter Square	O S	S	S			X	X		9
b. Scriber	X	X	X				X		13
c. Divider and Trammel	O				*	*	X		7
d. Chalkline						X	X	X	26
e. Pencil and Marking Crayons	O S	O S	S	X	*	* X	X	X	26
3. Layout									
a. Various Types of Levels		X				X	X	X	25
b. Surveying Instruments						X	X		12
c. Laser							X		6

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
D. Select and Use Materials, Tools, Equipment to Perform a Job									
MATERIALS:									
1. Acoustic Material						X	X		7
2. Adhesives: Glue, Cement, Epoxy, Etc.	O X S	W X S	X S	X	*	* X	X	X	23
3. Abrasives	O S	✓ W S	✓ S	X	*	* X	X		12
4. Aggregates: Sand, Gravel, Crushed Rock, Etc.						X	X	X	14
5. Appliances: Ranges, Refrigerators, Dishwashers, Etc.						X	X		9
6. Asbestos Materials							X		7
7. Cabinets: Factory Built; Metal, Wood, Plastic		X	X		*	* X	X		13
8. Caulking Materials						X	X	X	18
9. Conductors: Electric, Heat							X		8
10. Conduits and Conduit Fittings							X		5
11. Doors and Door Frames						X	X		9
12. Dry Wall Covering						X	X		5
13. Fasteners: Nails, Screws, Bolts, Staples, Heavy Timber Fasteners, Etc.	O X	W X	X	X	*	* X	X	X	34
14. Fixtures: Lighting, Heating						X	X		10
15. Flooring Materials: Linoleum, Vinyl, Asphalt, Cork, Etc.					X	X	X		5
16. Glass and Glazing Supplies						X	X		6
17. Hardware: Hinges, Catches, Locks, Etc.			X	X	*	* X	X		11
18. Heating Equipment: Furnaces, Boilers, Etc.					X	X	X		10

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
D. Select and Use Materials, Tools, Equipment to Perform a Job (Contd.)									
19. Insulation: Building, Batts, Rolls, Etc.					X	X	X	X	16
20. Insulation, Electric: Tapes, Liquids, Etc.						X	X		8
21. Lumber, Dimension	O X S	✓ W S X	✓ X S	X	*	* X	X	X	18
22. Lumber, Finish: Moulding, Siding, Etc.					*	* X	X		11
23. Masonry Products: Brick, Concrete, Block, Fire Brick, Tile, Etc.					X	X	X		9
24. Mortar Ingredients: Lime, Portland Cement, Etc.						X	X		9
25. Metals: Sheets, Plates, Extruded, Angles, Hardware Cloth, Etc.							X		13
26. Paints and Finishes: Including Thinners and Cleaners	O	W X		X	*	* X	X		10
27. Panels, Electrical						X	X		6
28. Pipe and Pipe Fittings							X	X	16
29. Plaster and Plaster Materials						X	X		3
30. Plasterboard						X	X		5
31. Plastics: Wire, Cloth, Screen, Sheet, Tubing							X		9
32. Plastic Laminates					*	*	X		9
33. Plywood		X S	S		* X	* X	X	X	14
34. Plumbing Fixtures					X	X	X		9
35. Pre-Cast Masonry Units							X		7
36. Reinforcing Materials: Mesh, Ties, Metal Lath, Rod, Etc.						X	X		13
37. Roofing Materials: Tar, Felt Paper, Shingles, Gutters, Downspouts, Flashing, Etc.					X	X	X	X	18

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
D. Select and Use Materials, Tools, Equipment to Perform a Job (Contd.)									
38. Ropes and Cables							X	X	15
39. Timber, Structured: Laminated						X	X		6
40. Water Proofing Materials						X	X	X	21
41. Welding Supplies, Arc		X					X		9
42. Welding Supplies, Gas	X						X		11
43. Welding Fuels (Gases)	✓ X	✓	✓				X		10
44. Windows and Window Frames					X	X	X		10
TOOLS AND EQUIPMENT									
45. Air Compressors	O					X	X	X	21
46. Benders, Pipe and Conduit			X				X		12
47. Boring Tools, Hand (Wood): Hand Drills, Reamers	O	W X			*	* X	X	X	24
48. Buffers							X		8
49. Caulking Equipment						X	X	X	23
50. Concrete and Mortar Mixing Tools						X	X		13
51. Concrete Finishing Tools: Float, Darby, Etc.						X	X		9
52. Crane or Hoist (Small, Electric)									9
53. Cutting Machine (Sheetmetal)									12
54. Drill: Portable	O X S	✓ W X S	✓ S	X	*	* X	X	X	30
55. Drill: Stationary	O X S	✓ W X S	✓ S				X		8

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
D. Select and Use Materials, Tools, Equipment to Perform a Job (Contd.)									
56. Electrical Hand Tools: Side Cutters, Pliers, Etc.	O X					X	X	X	20
57. Fastening Tools: Hammers, Axes, Wrenches Pliers, Screwdrivers, Nail Sets	O X	X		X	*	* X	X	X	30
58. Float: Power							X		4
59. Gas Torch or Furnace		X						X	16
60. Grinding Machines	X	X	X				X	X	14
61. Holding Tools: "C" Clamps, Bar Clamps, Vise, Pipe Clamps, Etc.	O X S	✓ X S	✓ X S	X	*	*	X	X	17
62. Impact Power Tools					*	*	X	X	15
63. Layout, Measuring, Marking and Checking Instruments: Transit, Plumb Bob, Tape, Etc.	X S	✓ X S	✓ X S			X	X	X	21
64. Motors, Gasoline		X					X		3
65. Nailing Machine					*	*	X		12
66. Oxy-Acetylene Welder	X	✓	✓						12
67. Painting and Finishing Equipment: Brushes, Rollers, Etc.	O			X	*	* X			11
68. Planer (Surfacer): Wood	O S	✓ W + S X	✓ S	X	*	*	X		7
69. Polishing Tools, Power		X	X				X		5
70. Power Plane, Portable							X		4
71. Power Actuated Tools							X		13
72. Power Pipe Machine: Threading, Reaming, Cutting								X	18
73. Prying Tools: Nail Pullers, Wrecking Bars, Crow Bars, Etc.			X			X	X	X	23
74. Riveting Equipment	X								12

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
D. Select and Use Materials, Tools, Equipment, to Perform a Job (Contd.)									
75. Router	O X S X	✓ W S +	✓ S	X	*	*	X		12
76. Sanders	O X S	✓ W S +	✓ S	X	*	* X	X	X	14
77. Saws: Band, Circular, Jig, Scroll, Skill, Radial Arm, Saber	O X S	✓ W S +	✓ X S	X	*	* X	X	X	27
78. Scaping Tools: Hand and Power						X	X		11
79. Sharp Edge Cutting Tools, Hand: Chisels, Star Drill, Countersink, Knives, Tin Snips	O X S	✓ W S +	✓ S	X	*	* X	X	X	29
80. Soldering and Brazing Equipment	✓ X	✓ X	✓					X	19
81. Spray Gun and Equipment	O	X	X	X	*	* X	X		8
82. Staplers					*	* X	X	X	20
83. Tooth Cutting Tools, Wood (Hand): Saws, Files, Rasps, Etc.	O ✓ S X	✓ W S +	✓ S	X	*	* X	X	X	27
84. Tooth Cutting Tools, Metal (Hand): Saws, Files, Etc.	O ✓ X	✓ W	✓				X	X	18
85. Tool Sharpening Equipment (Hand): Files, Oil Stones, Etc.	O	✓ X	✓	X	*	*	X	X	20
86. Transit						X	X	X	17
87. Trowels, Power						X	X		7
88. Welder	✓	✓ X	✓ X						11
E. Select and Use Scaffolding and Rigging									
1. Identify Rope, Twine and Synthethic Slings and Fasteners									10
2. Calculate Weight Loads									13
3. Select Rigging to Handle Load									12
4. Select Lifting Device (Crane, Chain, Hoist, Rope Fall)								X	14

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
E. Select and Use Scaffolding and Rigging, Etc.									
5. Use Safety Tag Lines								X	14
6. Use Various Types of Ladders							X	X	31
7. Rig Electric Swing Scaffolding									8
8. Rig Hand "Rope Falls" Swinging Scaffold									7
9. Dismantle Scaffolding								X	19
10. Clean and Store Scaffolding									13
11. Set up Tubular Scaffolding						X	X	X	21
F. Cut and Fit Materials									
1. Foundations and Sills						X	X		10
2. Floor and Ceiling Joists						X	X		10
3. Headers and Trimmers						X	X		12
4. Plywood and Wood Decking						X	X		10
5. Stair Stringers						X	X		8
6. Columns, Beams and Braces						X	X		10
7. Wall Studs and Plates						X	X		13
8. Blocking and Bracing in Walls						X	X		13
9. Plywood, Insulation Board, Gypsum Board Wall and Roof Sheathing						X	X	X	16
10. Rafters and Purlins for Roof						X	X		7
11. Trusses						X	X		8

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
F. Cut and Fit Materials (Contd.)									
12. Timbers, Glue Lamps, Decking & Sheathing						X	X		8
13. Prefab Rock Deck System									10
14. Metal Studs							X		9
15. Wallboard						X	X		8
16. Suspended Ceiling							X		10
17. Stress Skin Panels									2
18. Plywood Box Beams									6
19. Folded Plate Roofs									3
20. Bridging						X	X		7
21. Sawhorses						X	X	X	14
22. Hangswing and Bifold Doors						X	X		8
23. Cabinets			S	X	*	*X	X		8
24. Interior and Exterior Trim						X	X		8
25. Siding						X	X		9
26. Formica Type Materials					*	*X	X		6
27. Marlite Type Materials							X		4
28. Acoustic Tile and Sheets						X	X		2
29. Overhead Garage Doors						X	X		7
30. Screen Doors							X		9

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
F. Cut and Fit Materials (Contd.)									
31. Movable Partitions							X		4
32. Staircase and Handrails							X		8
33. Hardwood Floors						X	X		5
34. Wood and Plastic Gutters						X			5
35. Wall Paneling							X		7
36. Holes for Sinks and Appliances					*	* X	X	X	14
37. Floor Covering						X	X		4
38. Vinyl Asbestos Tile						X	X		3
39. Rubber Base Floor Covering						X	X		3
40. Carpet Over Pad Floor Covering						X	X		3
41. Glue Down Carpet							X		3
42. Plastic Laminate Floor Covering									2
43. Structural Ironwork									7
44. Metal Sheathing									5
45. Reinforcing Steel							X		7
46. Ornamental Ironwork									4
47. Water Lines						X			13
48. Drains and Sewers						X			13
49. Natural Gas Lines									10

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
F. Cut and Fit Materials (Contd.									
50. Bathtubs, Sinks or Laboratories						X	X		9
51. Showers, Faucets and Showerheads						X	X		9
52. Toilets and Urinals						X	X		9
53. Metal Flashing						X	X	X	23
54. 3 Tab Single						X	X		12
55. Dutch Lap and Other Shingles							X		7
56. Roll Roofing							X		10
57. Tile Roofing									6
58. Shake/Shingle Roofing							X		10
G. Fastener Materials									
1. Nails	O X	W		X	*	* X	X	X	26
2. Bolts	O X	X				X	X	X	18
3. Screws	O X	W		X	*	* X	X	X	23
4. Electric Arc Welding		✓ X	✓ X						10
5. Oxy-Acetylene Welding	X	✓ X	✓ X						11
6. Glues, Cements and Other Bonding Agents	O X S	S	S	X	*	* X	X	X	20
7. Caulking Compounds	O					X	X	X	22
8. Sweat Copper Pipe Together			X					X	15
9. Solvent for Joining Plastic Pipe								X	16

DUTY AND TASK STATEMENTS	CURRENT LEVELS OF INSTRUCTION								
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
G. Fastener Materials (Contd.)									
10. Knots and Hitches									11
H. Finish Materials									
1. Sand Floors									4
2. Prepare Surfaces	O S	S	S			X	X		13
3. Patch Cracks	O S	S	S			X	X		13
4. Sandblast									5
5. Use Painting Equipment									
a. Brushes	O				*	* X	X		11
b. Roller						X	X		9
c. Spray Gun	O		X	X	*	* X	X		8
6. Paint									
a. Interior						X	X		7
b. Exterior						X	X		7
c. Metal						X	X		10
d. Wood	O	X			*	* X	X		7
e. Stucco							X		4
f. Cement							X		5
g. Plastic							X		4
h. Sheet Rock						X	X		5

DUTY AND TASK STATEMENTS	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
H. Finish Materials (Contd.)									
7. Finish Concrete									
a. Place						X	X		10
b. Compact						X	X		10
c. Level						X	X		9
d. Edge						X	X		9
e. Float						X	X		9
f. Cure						X	X		7
g. Trowel						X	X		11
h. Broom Surface						X	X		8
i. Patch Surface						X	X		10
I. Calculate									
1. Add, Subtract, Multiply and Divide Whole Numbers	O ✓ S	✓ W S	✓ S	X	* X	* X	X	X	33
2. Fractions (Add, Subtact, Multiply and Divide)	S	S	S	X	* X	* X	X	X	31
3. Decimals	✓ S	✓ X S	✓ S	X	* X	* X	X	X	27
4. Conversion of Fractions to Decimals	X	X	X	X	* X	* X	X	X	23
5. Ratio and Proportion						X	X	X	21
6. Percentages						X	X	X	26
7. Area of Rectangles	X	X	X	X	* X	* X	X	X	20
8. Area of Circles	X	X	X		X	X	X	X	24

DUTY AND TASK STATEMENTS	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
I. Calculate (Contd.)									
9. Volume of Rectangles	X	X	X		X	X	X	X	20
J. Perform Related Tasks									
1. Drive Pick Up Truck								X	34
2. Use Telephone and Teletype Equipment							X	X	21
3. Read Handbooks, Catalogs and Manuals						X	X	X	29
4. Read Service Orders							X	X	30
5. Estimate Amounts and Costs of Materials		✓ W	✓		*	* X	X	X	29
K. Demonstrate Personal Qualities									
1. Honesty	O ✓ S X	✓ W S X	✓ X S	X	* X	* X	X	X	42
2. Punctual	O ✓ S X	✓ W + S X	✓ X S	X	* X	* X	X	X	41
3. Responsible	O ✓ S X	✓ W + S X	✓ X S	X	* X	* X	X	X	42
4. Safeworking Attitude	O ✓ S X	✓ W + S X	✓ X S	X	* X	* X	X	X	36
5. Follow Orders	O ✓ S X	✓ W + S X	✓ X S	X	* X	* X	X	X	42
6. Get Along With Others	O ✓ S X	✓ W + S X	✓ X S	X	* X	* X	X	X	42
7. Good Health Habits	O ✓ S	✓ + S	✓ S		* X	* X	X	X	41

APPENDIX N

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
A. Practice Accident and Safety Prevention								
1. Protective Clothing and Equipment								
2. Lifting and Carryhing								
3. Electric Power Tools								
4. Pneumatic Tools and Equipment								
5. Ladders								
6. Scaffolds								
7. Eye Protection								
8. Fumes, Dusts and Gases								
9. Materials Handling								
10. First Aid Training								
B. Read and Interpret Blueprints, Drawings and Job Specifications								
1. Blueprints								
a. Plot Plans								
b. Foundation Plans								
c. Floor Plans								
d. Elevation Plans								
e. Structural Plans								
f. Heating, Ventilating and Air Conditioning Plans								
g. Plumbing Plans								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
B. Read and Interpret Blueprints, Drawings and Job Specifications (Contd.)								
h. Electrical Plans								
i. Sprinkler Plans								
j. Communications Plans: Telephone, Intercom								
2. Read and Interpret Drawings								
a. Orthographic								
b. Isometric								
c. Oblique								
d. Perspective								
e. Sketches								
3. Job Specifications								
a. General								
b. Sheet Metal								
c. Plumbing								
d. Electrical								
e. Concrete								
f. Masonry								
g. Roofing								
h. Welding								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
C. Measure, Mark and Layout Construction Projects								
1. Measure								
a. Folding Rule								
b. Pull Out Tape								
c. 100' Tape								
d. Surveyor Chain								
e. Rafter Square								
f. Combination Square								
g. Tri-Square								
2. Mark								
a. Rafter Square								
b. Scriber								
c. Divider and Trammel								
d. Chalkline								
e. Pencil and Marking Crayons								
3. Layout								
a. Various Types of Levels								
b. Surveying Instruments								
c. Laser								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
D. Select and Use Materials, Tools, Equipment to Perform a Job								
MATERIALS:								
1. Acoustic Material								
2. Adhesives: Glue, Cement, Epoxy, Etc.								
3. Abrasives								
4. Aggregates: Sand, Gravel, Crushed Rock, Etc.								
5. Appliances: Ranges, Refrigerators, Dishwashers, Etc.								
6. Asbestos Materials								
7. Cabinets: Factory Built; Metal, Wood, Plastic								
8. Caulking Materials								
9. Conductors: Electric, Heat								
10. Conduits and Conduit Fittings								
11. Doors and Door Frames								
12. Dry Wall Covering								
13. Fasteners: Nails, Screws, Bolts, Staples, Heavy Timber Fasteners, Etc.								
14. Fixtures: Lighting, Heating								
15. Flooring Materials: Linoleum, Vinyl, Asphalt, Cork, Etc.								
16. Glass and Glazing Supplies								
17. Hardware: Hinges, Catches, Locks, Etc.								
18. Heating Equipment: Furnaces, Boilers, Etc.								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
D. Select and Use Materials, Tools, Equipment to Perform a Job (Contd.)								
19. Insulation: Building, Batts, Rolls, Etc.								
20. Insulation, Electric: Tapes, Liquids, Etc.								
21. Lumber, Dimension								
22. Lumber, Finish: Moulding, Siding, Etc.								
23. Masonry Products: Brick, Concrete, Block, Fire Brick, Tile, Etc.								
24. Mortar Ingredients: Lime, Portland Cement, Etc.								
25. Metals: Sheets, Plates, Extruded, Angles, Hardware Cloth, Etc.								
26. Paints and Finishes: Including Thinners and Cleaners								
27. Panels, Electrical								
28. Pipe and Pipe Fittings								
29. Plaster and Plaster Materials								
30. Plasterboard								
31. Plastics: Wire, Cloth, Screen, Sheet, Tubing								
32. Plastic Laminates								
33. Plywood								
34. Plumbing Fixtures								
35. Pre-Cast Masonry Units								
36. Reinforcing Materials: Mesh, Ties, Metal Lath, Rod, Etc.								
37. Roofing Materials: Tar, Felt Paper, Shingles, Gutters, Downspouts, Flashing, Etc.								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
D. Select and Use Materials, Tools, Equipment to Perform a Job (Contd.)								
38. Ropes and Cables								
39. Timber, Structured: Laminated								
40. Water Proofing Materials								
41. Welding Supplies, Arc								
42. Welding Supplies, Gas								
43. Welding Fuels (Gases)								
44. Windows and Window Frames								
TOOLS AND EQUIPMENT								
45. Air Compressors								
46. Benders, Pipe and Conduit								
47. Boring Tools, Hand (Wood): Hand Drills, Reamers								
48. Buffers								
49. Caulking Equipment								
50. Concrete and Mortar Mixing Tools								
51. Concrete Finishing Tools: Float, Darby, Etc.								
52. Crane or Hoist (Small, Electric)								
53. Cutting Machine (Sheetmetal)								
54. Drill: Portable								
55. Drill: Stationary								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
D. Select and Use Materials, Tools, Equipment to Perform a Job (Contd.)								
56. Electrical Hand Tools: Side Cutters, Pliers, Etc.								
57. Fastening Tools: Hammers, Axes, Wrenches Pliers, Screwdrivers, Nail Sets								
58. Float: Power								
59. Gas Torch or Furnace								
60. Grinding Machines								
61. Holding Rools: "C" Clamps, Bar Clamps, Vise, Pipe Clamps, Etc.								
62. Impact Power Tools								
63. Layout, Measuring, Marking and Checking Instruments: Transit, Plumb Bob, Tape, Etc.								
64. Motors, Gasoline								
65. Nailing Machine								
66. Oxy-Acetylene Welder								
67. Painting and Finishing Equipment: Brushes, Rollers, Etc.								
68. Planer (Surfacer): Wood								
69. Polishing Tools, Power								
70. Power Plane, Portable								
71. Power Actuated Tools								
72. Power Pipe Machine: Threading, Reaming, Cutting								
73. Prying Tools: Nail Pullers, Wrecking Bars, Crow Bars, Etc.								
74. Riveting Equipment								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
D. Select and Use Materials, Tools, Equipment, to Perform a Job (Contd.)								
75. Router								
76. Sanders								
77. Saws: Band, Circular, Jig, Scroll, Skill, Radial Arm, Saber								
78. Scaping Tools: Hand and Power								
79. Sharp Edge Cutting Tools, Hand: Chisels, Star Drill, Countersink, Knives, Tin Snips								
80. Soldering and Brazing Equipment								
81. Spray Gun and Equipment								
82. Staplers								
83. Tool Cutting Tools, Wood (Hand): Saws, Files, Rasps, Etc.								
84. Tooth Cutting Tools, Metal (Hand): Saws, Files, Etc.								
85. Tool Sharpening Equipment (Hand): Files, Oil Stones, Etc.								
86. Transit								
87. Trowels, Power								
88. Welder								
E. Select and Use Scaffolding and Rigging								
1. Identify Rope, Twine and Synthethic Slings and Fasteners								
2. Calculate Weight Loads								
3. Select Rigging to Handle Load								
4. Select Lifting Device (Crane, Chain, Hoist, Rope Fall)								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
E. Select and Use Scaffolding and Rigging, Etc.								
5. Use Safety Tag Lines								
6. Use Various Types of Ladders								
7. Rig Electric Swing Scaffolding								
8. Rig Hand "Rope Falls" Swinging Scaffold								
9. Dismantle Scaffolding								
10. Clean and Store Scaffolding								
11. Set up Tubular Scaffolding								
F. Cut and Fit Materials								
1. Foundations and Sills								
2. Floor and Ceiling Joists								
3. Headers and Trimmers								
4. Plywood and Wood Decking								
5. Stair Stringers								
6. Columns, Beams and Braces								
7. Wall Studs and Plates								
8. Blocking and Bracing in Walls								
9. Plywood, Insulation Board, Gypsum Board Wall and Roof Sheathing								
10. Rafters and Purlins for Roof								
11. Trusses								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
F. Cut and Fit Materials (Contd.)								
12. Timbers, Glue Lamps, Decking & Sheathing								
13. Prefab Rock Deck System								
14. Metal Studs								
15. Wallboard								
16. Suspended Ceiling								
17. Stress Skin Panels								
18. Plywood Box Beams								
19. Folded Plate Roofs								
20. Bridging								
21. Sawhorses								
22. Hangswing and Bifold Doors								
23. Cabinets								
24. Interior and Exterior Trim								
25. Siding								
26. Formica Type Materials								
27. Marlite Type Materials								
28. Acoustic Tile and Sheets								
29. Overhead Garage Doors								
30. Screen Doors								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
F. Cut and Fit Materials (Contd.)								
31. Movable Partitions								
32. Staircase and Handrails								
33. Hardwood Floors								
34. Wood and Plastic Gutters								
35. Wall Paneling								
36. Holes for Sinks and Appliances								
37. Floor Covering								
38. Vinyl Asbestos Tile								
39. Rubber Base Floor Covering								
40. Carpet Over Pad Floor Covering								
41. Glue Down Carpet								
42. Plastic Laminate Floor Covering								
43. Structural Ironwork								
44. Metal Sheathing								
45. Reinforcing Steel								
46. Ornamental Ironwork								
47. Water Lines								
48. Drains and Sewers								
49. Natural Gas Lines								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
F. Cut and Fit Materials (Contd.								
50. Bathtubs, Sinks or Laboratories								
51. Showers, Faucets and Showerheads								
52. Toilets and Urinals								
53. Metal Flashing								
54. 3 Tab Single								
55. Dutch Lap and Other Shingles								
56. Roll Roofing								
57. Tile Roofing								
58. Shake/Shingle Roofing								
G. Fastener Materials								
1. Nails								
2. Bolts								
3. Screws								
4. Electric Arc Welding								
5. Oxy-Acetylene Welding								
6. Glues, Cements and Other Bonding Agents								
7. Caulking Compounds								
8. Sweat Copper Pipe Together								
9. Solvent for Joining Plastic Pipe								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
G. Fastener Materials (Contd.)								
10. Knots and Hitches								
H. Finish Materials								
1. Sand Floors								
2. Prepare Surfaces								
3. Patch Cracks								
4. Sandblast								
5. Use Painting Equipment								
a. Brushes								
b. Roller								
c. Spray Gun								
6. Paint								
a. Interior								
b. Exterior								
c. Metal								
d. Wood								
e. Stucco								
f. Cement								
g. Plastic								
h. Sheet Rock								

DUTY AND TASK STATEMENTS	APPROPRIATE LEVELS FOR INSTRUCTION							
	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	APPRENTICESHIP/ ON-THE-JOB TRAINING
	7	8	9	10	11	12		
H. Finish Materials (Contd.)								
7. Finish Concrete								
a. Place								
b. Compact								
c. Level								
d. Edge								
e. Float								
f. Cure								
g. Trowel								
h. Broom Surface								
i. Patch Surface								
I. Calculate								
1. Add, Subtract, Multiply and Divide Whole Numbers								
2. Fractions (Add, Subtact, Multiply and Divide)								
3. Decimals								
4. Conversion of Fractions to Decimals								
5. Ratio and Proportion								
6. Percentages								
7. Area of Rectangles								
8. Area of Circles								

DUTY AND TASK STATEMENTS	JUNIOR HIGH			HIGH SCHOOL			COMMUNITY COLLEGE	INDUSTRY CORE	VALUE INDEX
	7	8	9	10	11	12			
I. Calculate (Contd.)									
9. Volume of Rectangles	X	X	X		X	X	X	X	20
J. Perform Related Tasks									
1. Drive Pick Up Truck								X	34
2. Use Telephone and Teletype Equipment							X	X	21
3. Read Handbooks, Catalogs and Manuals						X	X	X	29
4. Read Service Orders							X	X	30
5. Estimate Amounts and Costs of Materials		✓ W	✓		*	* X	X	X	29
K. Demonstrate Personal Qualities									
1. Honesty	0 ✓ S X	✓ W S X	✓ X S	X	* X	* X	X	X	42
2. Punctual	0 ✓ S X	✓ W + S X	✓ X S	X	* X	* X	X	X	41
3. Responsible	0 ✓ S X	✓ W + S X	✓ X S	X	* X	* X	X	X	42
4. Safeworking Attitude	0 ✓ S X	✓ W + S X	✓ X S	X	* X	* X	X	X	36
5. Follow Orders	0 ✓ S X	✓ W + S X	✓ X S	X	* X	* X	X	X	42
6. Get Along With Others	0 ✓ S X	✓ W + S X	✓ X S	X	* X	* X	X	X	42
7. Good Health Habits	0 ✓ S	✓ + S	✓ S		* X	* X	X	X	41

APPENDIX O_1

CURRICULUM NEEDS

QUESTIONS FOR JUNIOR HIGH INSTRUCTORS:

1. Are there some curriculum areas that I might introduce that would be helpful to my students who later enroll in construction classes?

2. Are there curriculum units that should be discussed and articulated with the high school teacher in order to provide a building block effect in curriculum delivery?

3. Can we complement each other's program in developing attitudes by adopting a common set of standards?

4. Are there some curriculum units that should be emphasized more?

5. Am I willing to provide the next level of education with a skills record of students' ability with tools, machines, materials and progresses?

6. What is the best procedure for assuring that the school curriculum is providing a continuum of learning experiences?

APPENDIX O_2

CURRICULUM NEEDS

QUESTIONS FOR COUNSELORS:

1. Do I have a clear profile of what is needed for success in the construction trades?

   Aptitude and Interest

   Skills Development

   Personal Qualities

   Math Skills

   Communication Skills

2. Do I have solid articulation bridges for routing construction students into apprenticeship? Jobs? Community college construction program?

3. Do I have an articulation bridge with the junior high school that provides specific information on students moving into high school programs?

4. Can I provide students with current information on jobs and outlook in the construction industry?

5. Do I have a system for placement of graduates in the construction trades? Apprenticeship? Further training?

Appendix P

SHORT RANGE PLAN (Example)

GOAL: 1.0 IMPLEMENT JOB PLACEMENT SERVICES FOR CONSTRUCTION STUDENTS

Objective	Activities/Strategies	Timeline	Responsibility Agent
1.1 Improve job search skills of construction students.	1.1.1 Identify places in instructional program.	Sept. 1982	Counselors
	1.1.2 Provide instructors with good materials for teaching job search.	Throughout Year	Counselors
	1.1.3 Provide instructors with inservice needed to do a good job.	As Needed	Counselors
	1.1.4 Evaluate to assure that students obtain job search competence.	Upon completion of Program	Counselors
1.2 Study feasibility of a formal placement service in high schools.	1.2.1 Identify positive and negative aspect of a placement program.	September 1982	Counselors
	1.2.2 Determine costs of a placement program.	October 1982	Counselors
	1.2.3 Identify staff requirements and assignments.	October, 1982	Counselors
	1.2.4 Present findings to school administration and school board.	October, 1982	Counselors

APPENDIX Q

LONG RANGE PLAN (Example)

Program Component	Present	Year 1	Year 2	Year 3	Year 4	Year 5
CURRICULUM	Newly developed scope and sequence curriculum	Utilize skills card to record student competence	Update curriculum with advisory committee	Update with committee	Update with committee	Update with committee
SUPPORT SERVICES	Newly developed Guidance Plan	Add Placement Function	Conduct employer follow-up	Update Guidance functions	Conduct follow-up of graduates	Update Guidance functions
SPECIAL NEEDS	Identified opportunitites for handicapped students	Identify jobs and recruit females into programs	Upgrade program of providing remedial instrudtion	Evaluate Special Needs Services	Update	Update
ARTICULATION	Good articulation with community college program	Strengthen ties with apprenticeship	Strengthen ties with junior high programs	Strengthen ties with industry	Evaluate articulation efforts	Plan articulation strategies
COMMUNITY RESOURCES	Good involvement of advisory committee	Expand CWE stations	Develop a resource directory	Evaluate use of community resources	Plan for expanded utilization of community	Continue effort

IDENTIFYING CURRICULUM NEEDS

DUTY A: PRACTICE ACCIDENT AND SAFETY PREVENTION

TASK STATEMENTS	GAPS	OVERLAPS	EMPHASIS
1. Protective Clothing and Equipment			
2. Lifting and Carrying			
3. Electric Power Tools			
4. Pneumatic Tools and Equipment			
5. Ladders			
6. Scaffolds			
7. Eye Protection			
8. Fumes, Dusts and Gases			
9. Materials Handling			
10. First Aid Training			

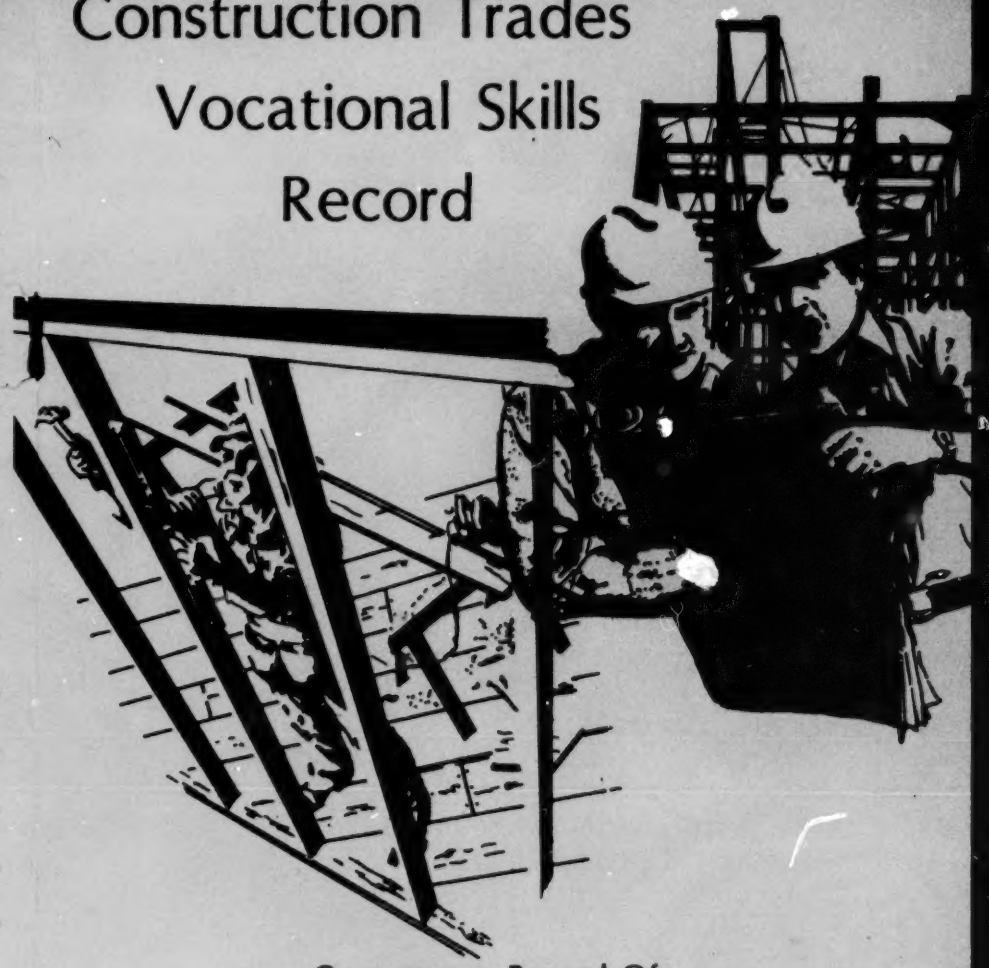
APPENDIX R_2

SUMMARY FOR IDENTIFYING CURRICULUM NEEDS

DUTY STATEMENT	GAPS	OVERLAPS	EMPHASIS
A. Practice Accident and Safety Prevention			
B. Read and Interpret Blueprints, Drawings and Job Specifications			
C. Measure, Mark and Layout Construction Projects			
D. Select and Use Materials, Tools, Equipment to Perform a Job			
E. Select and Use Scaffolding and Rigging			
F. Cut and Fit Materials			
G. Use Fastener Materials			
H. Finish Materials			
I. Calculate			
J. Perform Related Tasks			
K. Demonstrate Personal Qualities			

OTHER EXPERIENCE AND COMMENTS

Construction Trades Vocational Skills Record



Competency Record Of

_____

Instructor _____

School _____

Telephone _____

Skill or Task	Level of Proficiency		
	Understands	Performed With Supervision	Performed Without Supervision
A. Practice Safety and Accident Prevention			
1. Protective Clothing and Equipment			
2. Lifting and Carrying			
3. Electric Power Tools			
4. Pneumatic Tools and Equipment			
5. Ladders			
6. Scaffolds			
7. Eye Protection			
8. Fumes, Dusts and Gases			
9. Materials Handling			
10. First Aid Training			
B. Read and Interpret Blueprints, Drawings & Job Specifications			
1. Blueprints			
a. Plot Plans			
b. Foundation Plans			
c. Floor Plans			
d. Elevation Plans			
e. Structural Plans			
f. Heating, Ventilating and Air Conditioning Plans			
g. Plumbing Plans			
h. Electrical Plans			
2. Job Specifications			
a. General			
b. Sheet Metal			
c. Plumbing			
d. Electrical			

WORK EXPERIENCE RECORD

Dates	Jobs Performed	Evaluation

PLACEMENT RECORD

Date	Firm, Address and Contact	Contacted	Inter-Viewed	Result

Skill or Task	Level of Proficiency		
	Understands	Performed With Supervision	Performed Without Supervision
H. Calculate			
1. Add, Subtract, Multiply & Divide Whole Numbers			
2. Fractions (Add, Subtract, Multiply, and Divide)			
3. Decimals			
4. Conversion of Fractions to Decimals			
5. Ratio and Proportion			
6. Percentages			
7. Area of Rectangles			
8. Area of Circles			
9. Volume of Rectangles			
I. Perform Related Tasks			
1. Use Telephone and Telephone Equipment			
2. Read Handbooks, Catalogs and Manuals			
3. Read Service Orders			
4. Listen & Understand Directions			
J. Demonstrate Personal Qualities			
1. Honesty			
2. Punctual			
3. Responsible			
4. Safeworking Attitude			
5. Follow Orders			
6. Get Along With Others			
7. Good Health Habits			

Skill or Task	Level of Proficiency		
	Understands	Performed With Supervision	Performed Without Supervision
C. Measure, Mark and Layout Construction Projects			
1. Measure			
a. Folding Rule			
b. Pull Out Tape			
c. 100' Tape			
d. Combination Square			
e. Rafter Square			
2. Mark			
a. Chalkline			
b. Pencil and Marking Crayons			
3. Layout			
a. Various Types of Levels			
b. Transits			
D. Select and use Materials, Tools, Equipment to Perform a Job			
MATERIALS			
1. Adhesives: Glue, Cement, Epoxy, Etc.			
2. Aggregates: Sand, Gravel, Crushed Rock, Etc.			
3. Caulking Materials			
4. Fasteners: Nails, Screws, Bolts, Staples, Heavy Timber Fasteners, Etc.			
5. Insulation: Building, Batts, Rolls, Etc.			
6. Lumber, Dimension			
7. Pipe and Pipe Fittings			
8. Plywood			
9. Roofing Materials: Tar, Felt, Paper, shingles, Gutters, Downspouts, Flashing, Etc.			
10. Ropes and Cables			
11. Water Proofing Materials			

Skill or Task	Level of Proficiency		
	Understands	Performed With Supervision	Performed Without Supervision

TOOLS AND EQUIPMENT

12.	Air Compressors			
13.	Boring Tools, Hand (Wood): Hand Drills, Reamers			
14.	Caulking Equipment			
15.	Drill: Portable			
16.	Electrical Hand Tools: Side Cutters Pliers			
17.	Fastening Tools: Hammers, Axes, Wrenches, Pliers, Screwdrivers, Nail Sets			
18.	Gas Torch or Furnace			
19.	Grinding Machines			
20.	Holding Tools: "C" Clamps, Bar Clamps, Vise, Pipe Clamps, Etc.			
21.	Impact Power Tools			
22.	Layout, Measuring, Marking and Checking Instruments: Transit, Plumb Bob, Tape, Etc.			
23.	Prying Tools: Nail Pullers, Wrecking Bars, Crow Bars, Etc.			
24.	Sanders			
25.	Saws: Portable, Circular, Table Saw, Radial Arm, Saber			
26.	Sharp Edge Cutting Tools, Hand: Chisels, Star Drill, Countersink, Knives, Tin Snips			
27.	Soldering and Brazing Equipment			
28.	Staplers			
29.	Tooth Cutting Tools, Wood (Hand): Saws, Files, Rasps, Etc.			
30.	Tool Cutting Tools, Metal (Hand): Saws, Files, Etc.			
31.	Tool Sharpening Equipment (Hand): Files, Oil Stones, Etc.			

Skill or Task	Level of Proficiency		
	Understands	Performed With Supervision	Performed Without Supervision

E. Select and Use Scaffolding and Rigging

1.	Select Lifting Device (Crane, Chain Hoist, Rope Fall)			
2.	Use Safety Tag Lines			
3.	Use Various Types of Ladders			
4.	Dismantle Scaffolding			
5.	Set Up Tubular Scaffolding			

F. Cut and Fit Materials

1.	Plywood, Insulation Board, Gypsum Board, Wall and Roof Sheathing			
2.	Sawhorses			
3.	Holes for Sinks & Appliances			
4.	Metal Flashing			

G. Fastener Materials

1.	Nails			
2.	Bolts			
3.	Screws			
4.	Glues, Cements and Other Bonding Agents			
5.	Sweat Copper Pipe Together			
6.	Solvent for Joining Plastic Pipe			

APPENDIX T

Beaverton Schools
District No. 48
P.O. Box 200 Beaverton, Oregon 97005
503/649-0442

George Russell
Deputy Superintendent
Instruction Division

August 9, 1982

TO: Industrial Arts Teachers
High School Principals
Intermediate School Principals
High School Curriculum Vice-Principals
Intermediate School Curriculum Vice-Principals

FROM: George Russell GER

RE: WOODWORKING CURRICULUM

Attached is the revised curriculum--Scope and Sequence--for the Woodworking Sequence and Construction Cluster. The original document was developed in June 1981 by a team of teachers made up of:

Wayne Bridges - Five Oaks	Don Lary - Meadow Park
Wayne Estvold - Sunset High	Ralph Powell - Beaverton High
Ken Kline - Beaverton High	Will Thomas - Cedar Park
Ed Korver - Highland Park	

Based on the first year's use, modifications to the original program have been made and are reflected in the present document. It represents the District program and is to be utilized in all schools effective with the 1982-83 school year. Building administrators are responsible for monitoring the appropriate implementation.

c: Directors of Operations

STANDARDS FOR OREGON PUBLIC SCHOOLS 1980	ORS 581-22-211 Goals District Requirements

DISTRICT REQUIREMENTS

Program Goals in Industrial Education

Program goals are targets or accomplishments for students as they complete their industrial education experiences in the Beaverton School system.

(1) The student has the knowledge and skills necessary for recognition and maintenance of safe living and working environment.

(2) The student knows how his own talents, aptitudes, and interests relate to vocational and avocational opportunities in industry and technology.

(3) The student has basic skills in the use of common industrial tools, processes, and products.

(4) The student knows the industrial society's responsibilities in the ecological structure.

(5) The student will be able to develop problem solving and creative abilities as they relate to industry and society.

(6) The student is able to plan avocational activities to balance and enrich vocational pursuits.

(7) The student has technical skills and knowledge necessary for job entry or advanced training.

(8) The student is able to apply and extend basic educational skills in solving industrial problems.

COURSE GOALS

Woodworking Sequence
and
Construction Cluster (Woods portion)

1. The student values safe working conditions and demonstrates safe working practices.

2. The student knows that planning is a systematic process which is followed to develop a product.

3. The student is able to select and use the proper tools for measuring and layout work.

4. The student is able to select and use the proper tools for specific smoothing operations.

5. The student is able to select and use the proper tools for specific cutting operations.

6. The student is able to select and use the proper tools for specific boring operations.

7. The student is able to select and use the proper tools for specific turning techniques.

8. The student is able to select and use appropriate finishing techniques and materials for a specific application.

9. The student is able to identify, select, and use common fastening techniques and materials for a specific application.

10. The student is aware of career opportuities, job characteristics, and required training for specific jobs in the woods and construction industries.

11. The student recognizes the value of woodworking as a leisure-time activity.

12. The student recognizes the necessity for conservation of materials and the impact of wood-related processes on the environment.

13. The student recognizes the personal qualities necessary to function as a productive member of society.

I - E: WHAT DO THEY MEAN?

The attached sheets showing scope and sequence for the woods indicate Minimum levels of instruction at each grade level. The notation for introductory instruction "I" indicates that the student is able to identify the tool or machine and is aware of its basic uses. As a result of introductory activities, the student should also be able to perform basic operations with hand tools. The student will also pass the General Safety Test at this level.

Emphasis "E" indicates a higher level of instruction. "E" for machines or portable power tools indicates that the teacher has demonstrated the safe use of the machine, that the student has passed the appropriate School District safety test, and has demonstrated safe use of the tool or machine. These activities must be in compliance with the Beaverton School District Safety Handbook adopted in 1981.

Emphasis "E" in regard to certain processes, knowledges, and skills indicates a higher level of instruction. Students should be able to demonstrate increased ability in the use of tools and processes, as well as a greater depth of understanding of these processes.

In the ninth grade column, the small "e" and "i" refer to ninth grade Construction class where it is offered.

FORMAT

The format has been altered somewhat from the original document. The original was computer generated and has different spacings in the columns identifying the numbers for the processes/tools/products. The same identifying numbers are used, however.

The number in the "Item #" column identifies the location in the total item listing on the computer. It serves no particular purpose in this document. It is listed so the computer printout and this document can be cross-checked.

The statement at the top of the Course Description "Items Sorted By Field(s)" refers to the computer program, in which the course program is divided into thirteen (13) fields or basic topics.

If some numbers in the sequence are omitted, it is because the items in the original computer program were purged as a result of feedback and review. It does not indicate an error.

WOODS AND CONSTRUCTION

Items Sorted by Field(s): 1 2
Page 1 of 4

Item #			7	8	9	10	11	12	Const
170	1	***** SAFETY *****							
2	1.1	School Dist #48 General Safety Test #1	E	E	E	E	E	E	E
	1.2	Personal Protection							
4	1.2.1	Eyes	E	E	E	E	E	E	E
5	1.2.2	Ears	I	I	I	I	I	I	I
6	1.2.3	Respirators-Shop Apron Hard Hat-Etc.	I	I	I	I	I	I	E
	1.3	Emergency Procedures							
8	1.3.1	Fire	E	E	E	E	E	E	E
9	1.3.2	Accident	E	E	E	E	E	E	E
10	1.4	Electrical	I	I	I	I	I	I	E
11	1.5	Responsibility of Discovery	E	E	E	E	E	E	E
12	2	***** PLANNING *****							
13	2.1	Select Reasonable Proj-Material/Equip Avail	E	E	E	E	E	E	E
14	2.2	Write a Bill of Materials	E	E	E	E	E	E	E
15	2.3	Write a Plan of Procedure	E	E	E	E	E	E	E
16	2.4	Follow a Plan of Procedure	E	E	E	E	E	E	E
17	2.5	Sketch Working Drawings	E	E	E	E	E	E	E
18	2.6	Read Plans & Determine Import Facts & Dimen	E	E	E	E	E	E	E
19	2.7	Design/Function	E	E	E	E	E	E	E
	2.8	Conservation and Utilization of Natural Resources							
21	2.8.1	Environmental Impact	I	I	I	I	I	I	E
22	3	***** MEASURING AND LAYOUT TOOLS *****							
23	3.1	Rules	E	E	E	E	E	E	E
24	3.2	Tapes	I	I	E	E	E	E	E
25	3.3	Steel Squares	I	I	e	I	I	I	E
26	3.4	Try Squares	E	E	E	E	E	E	E
27	3.5	Combination Square	I	I	I	E	E	E	E
28	3.6	Marking Guage		I	I	I	E	E	E
29	3.7	Dividers	I	I	I	I	I	I	I
30	3.8	Compass	I	I	I	I	I	I	I
171	3.9	Scratch Awl			I	I	I	I	N/A
172	3.10	Sliding "T" Bevel			I	E	E	E	E
173	3.11	Trammel Points			I	E	E	E	N/A
174	3.12	Calipers		I	I	I	I	I	N/A
35	3.13	Levels			1	I	I	I	E
36	3.14	Transits							E
37	3.15	Chalk Line Reel			1	I	I	I	E
38	3.16	Plumb Bob			1				E
39	3.17	Story Pole			1	I	I	I	E
169	4	***** SMOOTHING TOOLS *****							
176	4.1	Planes - Smooth/Block/Jack		I	E	E	E	E	E
46	4.7	Files	I	I	I	I	I	I	I
47	4.8	Rasps	I	I	I	I	I	I	I
48	4.9	Abrasives	E	E	E	E	E	E	E
49	4.10	Cabinet Scrapers				I	I	I	

Item #			7	8	9	10	11	12	Const
50	5	***** CUTTING TOOLS (HAND) *****							
	5.1	Saws							
52	5.1.1	Back	E	E	E	E	E	E	E
53	5.1.2	Cross Cut	E	E	E	E	E	E	E
54	5.1.3	Rip	E	E	E	E	E	E	E
175	5.1.4	Miter Box		I	E	E	E	E	I
56	5.1.5	Coping	I	I	I	I	I	I	E
57	5.1.6	Sheetrock Saw/Keyhold			i				E
58	5.1.7	Hack							I
59	5.2	Chisels	I	I	E	E	E	E	E
177	5.3	Utility Knife			I	E	E	E	E
61	6	***** BORING TOOLS *****							
62	6.1	Brace			I	I	I	I	I
178	6.2	Hand Drill - Egg Beater			I	I	I	I	I
	6.3	Bits							
180	6.3.1	Spade		I	I	I	I	I	I
66	6.3.2	Auger			I	I	I	I	I
67	6.3.3	Twist	I	I	I	I	I	I	I
68	6.3.4	Forstner		I	I	I	I		N/A
69	6.3.5	Multi Spur	I	I	I	I	I	I	I
70	6.3.6	Expansion			I	I	I	I	I
71	6.3.7	Fly Cutter			I	I	I		N/A
73	6.3.9	Hole Saw	I	I	I	I	I	I	I
74	6.4	Drill Press	E	E	E	E	E	E	N/A
75	6.5	Portable Electric Drill	E	E	E	E	E	E	E
76	7	***** FASTNERS *****							
	7.1	Holding							
78	7.1.1	Clamps	E	E	E	E	E	E	I
79	7.1.2	Vise	E	E	E	E	E	E	I
81	7.1.4	Temporary Bracing			e				E
82	7.1.5	Doweling Jig			I	E	E	E	N/A
	7.2	Drivers							
84	7.2.1	Hammers	I	I	e	e	e	e	E
85	7.2.2	Staplers			i	I	I	E	E
86	7.2.3	Nail Set	I	I	I	I	I	I	E
88	7.2.5	Sledge			i				E
89	7.2.6	Screw Driver		I	E	E	E	E	E
	7.3	Screw-In							
91	7.3.1	Wood Screws		I	E	E	E	E	E
92	7.3.2	Lag Screws			I	I	I	I	I
93	7.3.3	Machine Screws							I
	7.4	Drive-In							
96	7.4.1	Nails	I	I	I	E	E	E	E
97	7.4.2	Dowels		I	I	I	I	I	
98	7.4.3	Drive In Fastners - Others IE. Clips							E
99	7.4.4	Gant Plates			i				E
	7.5	Adhesives							
102	7.5.2	Glues and Cements	I	E	E	E	E	E	E
103	7.5.3	Solders							I

Item #			7	8	9	10	11	12	Const
104	8	***** SMOOTHING TOOLS (POWER) *****							
	8.1	Sanders							
106	8.1.1	Production				E	E	E	N/A
107	8.1.2	Stationary	I	E	E	E	E	E	N/A
108	8.1.3	Portable	I	E	E	E	E	E	E
109	8.2	Jointer	I	I	I	E	E	E	E
110	8.3	Planer	I	E	E	E	E	E	N/A
179	8.4	Uni-Plane		I	I	I	I	I	N/A
112	9	***** CUTTING TOOLS (POWER) *****							
113	9.1	Circular (Table Saw)	I	I	E	E	E	E	E
114	9.2	Radial Arm	I	I	E	E	E	E	E
115	9.3	Band	E	E	E	E	E	E	N/A
116	9.4	Scroll	E	E	E	I	I	I	N/A
117	9.5	Grinder				E	E	E	E
118	9.6	Power Miter			I	E	E	E	E
119	9.7	Shaper				I	I	I	N/A
	9.8	Portables							
121	9.8.1	Circular			e	I	I	I	E
122	9.8.2	Saber	I	E	E	E	E	E	E
123	9.8.3	Reciprocating Saw							E
124	9.8.4	Router	I	E	E	E	E	E	E
147	10	***** SPECIALTY TOOLS *****							
148	10.1	Plumbing							I
149	10.2	Electrical							I
150	10.3	Framing			1				E
151	10.4	Finishing							I
152	10.5	Surveying							E
125	11	***** TURNING TOOLS *****							
126	11.1	Lathe	I	I	I	I	I	I	N/A
127	12	***** FINISHING *****							
128	12.1	Lacquer	I	I	I	I	I	I	I
129	12.2	Varnish	I	I	I	I	I	I	I
	12.3	Paint							
131	12.3.1	Interior	I	I	I	I	I	I	E
132	12.3.2	Exterior							E
133	12.4	Oil	I	I	I	I	I	I	I
	12.5	Preparation							
135	12.5.1	Putty	I	E	E	E	E	E	E
136	12.5.2	Paste Fillers			I	E	E	E	I
137	12.5.3	Sanding	E	E	E	E	E	E	E
138	12.5.4	Stain	I	I	I	I	I	E	E
139	12.6	Caulking							I
140	12.7	Rollers							E
141	12.8	Brushes	I	I	I	I	I	I	E
142	12.9	Spray			I	E	E	E	E
143	12.10	Concrete							E
144	12.11	Plaster							I
145	12.12	Drywall							I
146	12.13	Polymers			I	I	I	I	I

Item #			7	8	9	10	11	12	Const
153	13	***** RELATED OCCUPATIONS *****							
154	13.1	Carpenter	I	I	e	I	I	I	E
155	13.2	Cement Mason			1				I
156	13.3	Floor Layer			1				E
157	13.4	Painter			1				E
158	13.5	Plumber			1				I
159	13.6	Electrical Trades			1				I
160	13.7	Roofer			1				E
161	13.8	Structural Steel Workers			1				I
162	13.9	Insulation			1				E
163	13.10	Cabinet Maker	I	I	I	I	I	I	I
164	13.11	Plasterer			I				I
165	13.12	Furniture Maker	I	I	I	I	I	I	I
166	13.13	Architect		I	I	I	I	I	I
167	13.14	Engineer			1				I
168	13.15	Pattern Maker			1				I

APPENDIX U

CONSTRUCTION CLUSTER MODEL PROJECT

COUNSELING ASPECTS

INITIAL PLANNING FOR SOUTH AREA IMPLEMENTATION

AT THE INTERMEDIATE AND SENIOR HIGH SCHOOL LEVELS

July 1981

Ken Box, Central Office
Marge Mandel, Whitford Intermediate School
Tom Morris, Beaverton High School
Gaynelle Nolf, Beaverton High School
Carol Warren, Highland Park Intermediate School

CONSTRUCTION CLUSTER MODEL PROJECT

Draft 2

I. Intermediate School - High School Articulation of Counseling and Instructional Programs

I.1 Goal: To provide inservice for counselors and administrators.

Activities:
- I.1.1 Ken Box will present an overview of the entire project.
- I.1.2 Visit the Beaverton High School home construction site.
- I.1.3 Presentation by Ralph Powell, Applied Arts Department Chairman, Ken Kline, Construction Cluster teacher, and Mary Delaurenti, Interior Design teacher. (All at Beaverton High School)
- I.1.4 Nontraditional role person(s) and handicapped person(s) to speak.
- I.1.5 Intermediate school counselors and administrators meet with intermediate applied arts teachers to discuss what the teachers do in their classrooms.
- I.1.6 High school counselors and administrators meet with high school applied arts teachers to discuss what the teachers do in their classrooms.
- I.1.7 Intermediate school counselors will periodically visit Beaverton High School classes to become familiar with various programs.

Personnel Involved: Ken Box and intermediate and high school counselors and administrators.

* II. Intermediate School Student Orientation Program

II.1 Goal: To familiarize incoming 7th graders with intermediate school course offerings - as part of the overall orientation to intermediate school.

Activities:
- II.1.1 Intermediate school counselors will visit feeder elementary schools and discuss the elective program emphasizing that electives are designed to be exploratory and varied.
- II.1.2 Counselors will show a tape slide presentation that highlights all aspects of junior high life and focuses especially on activities in the elective classes.
- II.1.3 Counselors will be available for individual student and/or parent conferences as requested.

Personnel Involved: Sixth grade students and teachers; intermediate school counselors.

* It is recommended that career awareness activities should occur periodically during the school year. As yet, no program for such is developed nor is any person available to coordinate such a program in the intermediate schools. A community resource coordinator could handle this job most effectively.

Materials Needed: Intermediate school program planning guide and related materials, tape slide presentation, Beaverton High School cluster handouts.

II.2 Goal: To familiarize incoming eighth graders with eighth grade elective classes.

Activities: II.2.1 In the spring, counselors will give general orientation to 7th grade block classes and will have a representative from each curriculum area give a ten minute presentation about elective classes in that area.

II.2.2 Counselors will be available for individual student and/or parent conferences.

Personnel Involved: Seventh grade block teachers and students, school counselors, representatives from each curriculum area.

Materials Needed: Current program planning guide and related materials, Beaverton High School cluster handouts.

II.3 Goal: To familiarize incoming ninth graders and parents with high school graduation requirements, high school planning, and will emphasize the importance for students to begin some tentative career planning.

Activities: II.3.1 In the spring, intermediate school counselors and appropriate senior high school representatives will conduct an evening parent meeting to discuss items relating to the above-stated goals.

(a) Intermediate school curriculum vice principal will present introduction and overview.
(b) Intermediate school counselors will discuss graduation requirements and will introduce the concept of a four-year high school plan.
(c) High school guidance vice principal and career counselor will present the following information:

(1) How students obtain career planning information at the high school.
(2) What are the alternate routes students can take after high school.

(d) Intermediate and high school people will answer questions pertaining to materials presented in the meeting.

Personnel Involved: Intermediate school counselors and curriculum vice principal; senior high guidance vice principal and career counselor.

Materials Needed: Current intermediate school program planning guides and related materials; copies of four-year planning sheet, Beaverton High School cluster handouts.

Activity: II.3.2 Following the parent meeting, counselor(s) will meet with students in eighth grade science classes to disseminate and discuss the following materials:

(a) Ninth grade forecast sheet and program planning guide.
(b) Copies of the four-year planning worksheet.
(c) Available materials that focus on career planning after high school.

Personnel Involved: Counselor(s), eighth grade science teachers and classes.

Materials Needed: Ninth grade forecasting materials and career planning materials as noted above.

Activity: II.3.3 Counselor(s) will be available for individual parent/student conferences as requested.

III. Process for Moving Students from Tenth Grade Classes Into the Cluster Programs

III.1 **Goal:** To provide tenth grade students with information about the career clusters available to them.

Activity: III.1.1 *During the fall of their ninth grade year, all students will participate in a two to three-week unit in their English class on Career Awareness which will:

(a) Include guest speakers from various occupational fields.
(b) Emphasize nontraditional roles and opportunities for handicapped persons.
(c) Provide students with on-site observations in various occupational areas.

Personnel Involved: Varied - as noted above.

Activity: III.1.2 In the spring of their ninth grade year, all students will view a tape slide about career planning.

* Curriculum to be developed by selected intermediate counselors, English teachers, intermediate curriculum vice principal, high school guidance vice principal and counselors during the fall of 1981. (Release time will be provided.)

Personnel Involved: High school career counselor and intermediate school counselors.

Activity: III.1.3 Spring conference at the high school with counselor, parents, and students.

Personnel Involved: High school career counselor, other counselors, and guidance vice principal to visit intermediate school prior to individual parent-student-counselor scheduling conference at the high school.

Activity: III.1.4 In the fall of their tenth grade year, all students will view presentation in their Perspectives class by career counselor to introduce the cluster programs.

Personnel Involved: High school career counselor and guidance vice principal.

IV. Process for Moving Students from High School to Community College

IV.1 Goal: To familiarize high school counselors with different programs/options available to students at local community colleges - e.g. Project Advance at Portland Community College.

Activity: IV.1.1 Career counselor will arrange meetings of local community college and high school counselors. High school counselors will visit community college campuses.

Personnel Involved: High school and local community college counselors.

Materials Needed: ?

IV.2 Goal: To familiarize students with opportunities available at the local community colleges.

Activity: IV.2.1 Career counselor will arrange high school visitations by local community college personnel. Meeting dates and places will be announced to students. (High school counselors will be familiar enough with community college programs to counsel students individually about such.)

Personnel Involved: Local community college representatives, high school counselors.

Materials Needed: ?

V. Process for Moving Students from High School to Apprenticeships

Goal: V.1 To acquaint intermediate school and high school counselors with the apprenticeship concept and process.

Activity: V.1.1 Intermediate school and high school counselors will visit Apprenticeship Training Centers in Portland.

Personnel Involved: Above-mentioned counselors and spokesperson(s) at Apprenticeship Training Centers.

Materials Needed: ?

Goal: V.2 To develop ways in which more emphasis is given at the high school to apprenticeship programs.

Activities: V.2.1 High school career counselor will collect, organize and disseminate apprenticeship information to students and counselors.

V.2.2 High school career counselor will coordinate periodic presentations by persons from specific apprenticeship programs.

V.2.3 All high school counselors will be available to offer some general information about apprenticeships to students. More detailed, specific requests by students will be referred to the career counselor.

Personnel Involved: Career counselor, other high school counselors, apprenticeship instructors, and coordinators.

Materials Needed: Printed materials from Apprenticeship Training Centers. Organized file of apprenticeship materials.

VI. Process for Moving Students from High School to Job

Goal: VI.1 Improve overall job search technique of students.

Activities: VI.1.1 Define details of program.

VI.1.2 Identify places in instructional program.

Personnel Involved: To be determined in the fall of 1981.

Goal: VI.2 Study the feasibility of a job placement service in the high school.

Activity: VI.2.1 Identify the positive and negative aspects of the program, costs, personnel requirements.

Personnel Involved: To be determined in the fall of 1981.

Return lower portion

Dear Former Trainee,

Our Construction Cluster Program needs your help in evaluating our training program. We need to know if your training was helpful to you on the job.

If you will please fill out the answers to questions on the other half of this card, we will be thankful. Just tear the card along the dotted line and mail. Thanks for helping us to help others.

Ken Kline
Construction Instructor
Beaverton High School

Tear along dotted line --

stamp

Mr. Ken Kline
Construction Instructor
Beaverton High School
P.O. Box 200
Beaverton, Oregon 97075

D&H/MODEL CONSTRUCTION PROGRAM

The academically disadvantaged and/or handicapped (D&H) student requires a special instructional approach to meet success in many areas of education. Recognizing that many of these individuals will not find their greatest potential for success in strictly academic areas, it becomes critical to attend to the career and vocation directed needs that will have the most impact on their future. Beaverton School District provided planning time for special education personnel to develop a vocation related service model for LD, SED and EMR students for the 1981-82 school year. Following this planning period, the special education representative for this committee gathered information from a Beaverton High School resource room teacher (RRT), a special education work experience teacher (CWE) and the construction cluster teacher (CCT) regarding procedures for including D&H students in the construction program. A summary of the proposed plan will be presented in (1) dialogue form, (2) a list of activities to meet D&H objectives, and (3) a flow chart.

(1) Dialogue

Handicapped students in the Beaverton School District are identified via their inclusion in the "Individual Education Plan" (IEP) process. This designation provides them with some level of specialized services from RRTs. Those academically disadvantaged students that do not have an IEP can be identified with the assistance of guidance counselors. D&H students who express an interest in construction can be assisted to make application to the program by guidance counselors, RRTs, CWEs, and/or the CCT, RRTs and CWEs will also inform resource room students of the construction class and a more intensive level of recruitment could be used if needed. Advisement will also be given on shop classes (woods, drafting) that would be helpful to the student. Prior to acceptance in the construction program, an intake interview will be conducted by the RRT and CCT to ensure that the student has a realistic perception of the requirement.

RRTs, CWEs and the CCT agree that an effective communication and support system is vital to the success of the D&H student. A representative from each group will meet during the first week of September to set up a regular meeting schedule and to discuss intervention strategies. It has been suggested that the CCT initially meet with a RRT twice monthly to share information (later cut back to once a month). The CWE functions as community job placement person for D&H students and has frequent contacts with RRTs. He could, therefore, serve as a liason person between the construction site and resource room by visiting the work site to gather first-hand information. This could initially be done twice monthly (later cut back to once a month) on a schedule staggered with the above-mentioned one for optimum coverage.

The role of the RRT would be to work with the CCT to identify specific skills in the areas of communication, math and reading that the individual student is having difficulty with. Examples in each area are: communication (construction terminology, relating to supervision, etc.); math (add/subtract in inches, conversions, fractions, square footage, calculator use, etc.); reading (installation instructions, blueprints, etc.) The CCT will provide a list of entry-level competencies in these areas to the RRTs. Following identification of specific needs for individual students, an intensive tutoring program can be established. This

specialized instruction will occur in the resource room according to a schedule contracted between the student and the RRT. To further the comprehensive support of the student, RRTs, CWEs and the CCT will contact each other by phone related to problems that require immediate attention.

If a student is experiencing difficulty primarily related to a physical limitation, the consultative services of special education motor team personnel (occupational and/or physical therapists) could be procured. Services might include evaluation, recommendation of adaptive modalities, etc.

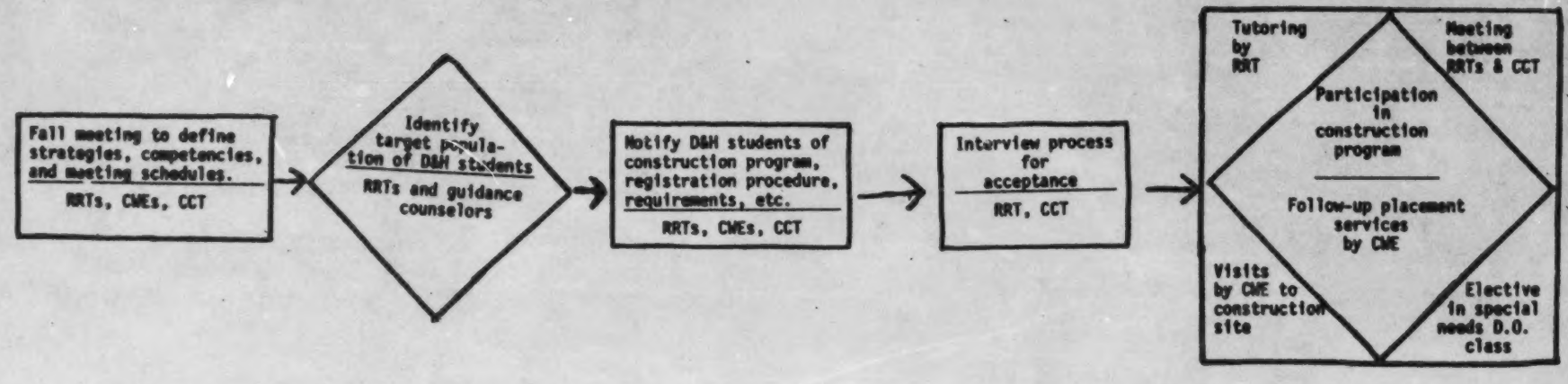
As of winter term '81-'82, Beaverton's resource rooms plan to be involved in a diversified occupation's (D.O.) class for special needs students. This class will provide instruction in vocation-related skills that teach the student how to seek, procure and keep a job. It is recommended that D&H students involved in the construction cluster also attend the D.O. class prior to graduation. The combination of a model construction program, a D.O. class and the services of a CWE should enhance the D&H individual's chances for success.

(2) Activities to Meet Objectives

Objective		Strategies/Activities		Timeline
1.5.6 & 1.5.7	Define how handicapped and/or academically disadvantaged students should be served.	1.5.6.1) 1.5.7.1)	Special Education representative gathers information from RRTs, CWEs and CCT.	June'81
		1.5.6.2) 1.5.7.2)	Establish effective communication system between RRTs, CWEs, and CCT through regularly scheduled meetings.	Sept. '81 Ongoing
		1.5.6.3) 1.5.7.3)	Develop effective intervention plan (see below) (RRTs, CWEs, CCT).	Sept. '81
2.3.3	Define system for identifying academically disadvantaged and handicapped students.	2.3.3.1)	Identify handicapped students from population served by IEP process.	Sept. '81 Ongoing
		2.3.3.2)	Identify academically disadvantaged students through guidance counselors.	
		2.3.3.3)	Make target population aware of construction program (RRTs, CWEs, CCT).	
		2.3.3.4)	Assist target population in registration process (RRTs).	
		2.3.3.5)	Utilize more intensive recruitment process if needed (RRTs, CWEs, CCT).	
2.3.4	Define system for providing remedial math and English to disadvantaged vocational students.	2.3.4.1)	CCT provides information to RRTs related to required math, reading, and communication skills.	
		2.3.4.2)	CWE visits construction site to gather first-hand information - relays to RRT.	
		2.3.4.3)	Schedule set-up between RRT and student for intensive tutoring in specific skills.	
		2.3.4.4)	Follow up contacts between RRT, CWE, CCT.	

	Objective		Strategies/Activities	Timeline
2.7.1	Identify physical limitations for each key occupation	2.7.1.1)	CCT contact representative from Bureau of apprenticeship & Training, U.S. Department of Labor	June '81
		2.7.1.2)	CCT pass on information to RRTs and CWEs.	Sept. '81
		2.7.1.3)	Secure required consultative services from Special Ed motor team (OT, PT) as needed.	Ongoing
2.7.2	Identify intellectual considerations for each key occupation.	2.7.2.1)	CCT prepare list of academic related competencies in math, reading, and communication.	June - Sept. '81
		2.7.2.2)	CCT meet with RRTs regarding list and to define intervention strategies.	Sept. '81
2.7.3	Define program modifications for providing access to D&H students.	2.7.3.1)	(See 1.5.6, 1.5.7, 2.3.4, 2.7.1, 2.7.2).	Sept. '81
2.7.4	Define teaching strategies that allow D&H students to succeed in program.	2.7.4.1)	Intensive tutoring by RRT in specific math, reading, and communication skills.	Ongoing
		2.7.4.2)	Elective participation in D.O. cluster for special needs students.	
		2.7.4.3)	Close and frequent communication between RRTs, CWEs, CCT.	

(3) Flow Chart


Fall meeting to define strategies, competencies, and meeting schedules.
RRTs, CWEs, CCT
Identify target population of D&H students
RRTs and guidance counselors
Notify D&H students of construction program, registration procedure, requirements, etc.
RRTs, CWEs, CCT
Interview process for acceptance
RRT, CCT
Tutoring by RRT
Meeting between RRTs & CCT
Participation in construction program
Follow-up placement services by CWE
Visits by CWE to construction site
Elective in special needs D.O. class

*RRT = Resource room teacher
CWE = Community work experience teacher (Special Education Department)
CCT = Construction cluster teacher

APPENDIX X

Women
in
the
Beaverton High School
Construction Cluster

RFP 8
March 1982

"There is virtually no job or career pattern that should now be called "for men only--for women only."

--Ruth Shinn
U.S. Department of Labor
from "Up, Up the Ladder"
Illinois Career Education Journal
Winter 1973

WOMEN IN THE BEAVERTON HIGH SCHOOL CONSTRUCTION CLUSTER PROGRAM

BEAVERTON DISTRICT MODEL CONSTRUCTION PROGRAM RFP 8 1980-81

The Beaverton School District's Model Construction Cluster Program components include the planning, developing, implementing and evaluating a model vocational construction cluster program at Beaverton High School and its exploration elements at the two intermediate feeder schools, Whitford and Highland Park. The model also includes curriculum and program articulation with post-secondary training at Portland Community College and the metropolitan apprenticeship programs.

The Construction Cluster Program Goals 1.0, 2.0, 3.0 and 5.0 address the issue of women in nontraditional job roles with the following questions: How should women be served by this model? What strategies should be developed to involve women in the Construction Cluster program? What planned activities can be implemented? What processes for working with women in non-traditional roles in the model program can be documented? This report seeks to answer these questions within the guidelines of the RFP.

CONSTRUCTION CLUSTER
1.5.5 STRATEGY

HOW WOMEN IN NONTRADITIONAL JOB ROLES SHOULD BE SERVED BY MODEL

Federal and state legislation mandates the involvement of women in nontraditional job roles. Title IX of the Education Amendments of 1972 prohibits discrimination on the basis of

sex in education. Title II, Vocational Education, of the Education Amendments of 1976, requires that sex discrimination, sex bias, and sex stereotyping be eliminated from all vocational education programs; moreover, Title II requires each state to set forth policies and procedures that will assure equal access to vocational education programs by both women and men, including incentives to encourage the enrollment of both women and men in nontraditional programs of study. Oregon laws prohibiting discrimination include ORS 659.50 and 659.030. The State Board of Education, furthermore, has adopted Oregon Administrative Rules regarding equal opportunity and nondiscrimination: OARs 581-21-045 through -049 and OAR 581-22-505. The Beaverton model seeks to respond to this legislation.

CONSTRUCTION CLUSTER
2.8 OBJECTIVE

DEVELOP STRATEGIES FOR INVOLVING WOMEN IN THE CONSTRUCTION CLUSTER PROGRAM

The National Center for Research in Vocational Education, Ohio State University, publication "Factors Influencing Non-traditional Vocational Education Enrollments: A Literature Review" (1979) includes the following summary chart of suggested strategies compiled from research conducted throughout the United States. This chart was used as a base for identifying strategies appropriate to the Beaverton program.

Suggested Strategies to Increase Nontraditional Enrollments (Based on Research Findings)

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
INFORMATION	Advertise existing programs and institutional interest in enrolling nontraditional students of both sexes. (N)*		X						
	Establish visibility of services to students. (N)					X			
	Be more aggressive re development and presentation of planned informational-orientation programs for pre-adolescent girls and their parents (e.g., increased use of public media). (M)								X
	Be realistic about workers' income, college ability vs employability payoff. (M)					X			
	Communicate programs and career options to broaden the appeal of vocational education to girls. (M)								X

*Research studies - see bibliography for full citation

D - Dixon (Postsecondary males)
I - Indiana New Educational Directions (High school males and females)
K_h - Kane and Frazee (high school females)
K_p - Kane, Frazee and Dee (Postsecondary females)
L - Lewis and Kaltreider (high school and high school graduates females and males)
M - Mitchell (High school females)
N - Nero (mid-career females)

**SB - State Vocational Education Board
I - Institution
A - Administrator
T - Teacher
C - Counselor
L - Librarian
S - Student
U - Unclassified

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
INFORMATION	Inform parents through newsletters about sex stereotypes and possible consequences for girls and boys. (L)								X
	Use career related materials that are sex fair whether in the library, counseling office, sex-fair handbooks, program descriptions, course syllabi, and classroom handouts. (L)								X
	Give a nonstereotyped view of courses and activities in displays on courses. (L)								X
	Be accessible to prevocational students on tours of vocational program areas. (L)							X	
	Revise printed materials (even if time consuming, this strategy may be easier than changing curriculum). (L)								X
	Change sex stereotyped course titles (e.g., Cooking to Food Production and Management of Vocational Agriculture to Earth Environment) to attract nontraditional students and enhance traditional students' occupational awareness and sense of worth. (L)								X
	Make course titles sex fair. (I)			X	X	X	X		
	Convey information and heighten awareness through bulletin boards, new book shelves, and/or display cases. (L)						X		

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
INFORMATION	Get on mailing lists for current career information. (L)						X		
	Encourage all women, especially for nontraditional and sex-integrated fields, to take math and science courses. (K_h)								X
	Supply high school women with adequate information so that (1) mature decisions can be made without internal or external pressure and (2) follow-through by enrolling is facilitated. (K_h)								X
	Attract women to nontraditional occupations by something besides earnings since some women, equally attracted by earnings, chose traditional occupations. (K_h)								X
	Inform women about opportunities in sex-integrated programs (which may have greater effect) rather than recruit them only from traditional to nontraditional occupations. (K_p)								X
	Provide parents specific information to put their influence on daughters to best use as early as possible. (K_p)								X
POLICY PLANNING IMPLEMENTATION	Review/revise all school policies and require a course on sexism in education for certification. (L)			X					
	Actively encourage junior high and high school compliance with legislation. (I)	X							

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
POLICY PLANNING IMPLEMENTATION	Legislate funded support of programs to attract women to enroll in vocational education. (M)								X
	Be vigorous in implementing plans to bring about sex equality since legislative change isn't automatic. (M)								X
	Avoid delays in implementation--be proactive. (L)								X
	Monitor progress as well as initiation of programs to enforce legislation. (L)								X
	Involve in some way all those who may be affected (directly or indirectly) so they are familiar with local plans. (L)								X
	Encourage prevocational nontraditional enrollment since course experience influences enrollment. (I)			X	X	X	X		
	Actively encourage girls in their vocational education enrollment. (M)								X
	Be sensitive to sex bias in tests. (L)					X			
	Be unbiased toward students' age, sex, and economic status. (N)					X			
	Use materials unbiased regarding sex and age. (N)		X						
	Provide employment services to assist the mid-career changer. (N)		X						

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
POLICY PLANNING IMPLEMENTATION	Expand vocational options for all students to choose programs for interest and employment prospects. (L)		X						
	Involve all school personnel in awareness raising and addressing sex stereotyping. (L)		X						
	Avoid overemphasizing the assumed difficulty of nontraditional students in finding related employment. (L)		X						
	Compile nontraditional student applications to have an accurate enrollment picture. (L)		X						
	Increase the number of women counselors in vocational schools to change the all-male image of vocational programs. (M)								X
	Increase the number of women nontraditional vocational education teachers. (M)								X
	Institute an affirmative action program to actively recruit both nontraditional teachers and students. (L)			X					
	Promote hiring nontraditional teachers for role models. (I)	X							
	Influence each other's career choice constructively (males, according to research, were the greatest critics of nontraditional men and women). (L)							X	

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
POLICY PLANNING IMPLEMENTATION	Planfully commit time and resources necessary to have a nonsexist environment. (L)			X					
	Assure students of sex-fair enrollment opportunity through an adequate supply of non-traditional promotional materials and career materials generally that relate occupational requirements to job titles rather than gender. (I)	X							
	Assure students of adult support for non-traditional students by enlisting teacher/counselor backing and by insisting on recruitment/selection procedures that don't discriminate or discourage students from nontraditional choices. (I)	X							
	Use earnings as a motivation selectively considering the characteristics of students rather than indiscriminately or just for encouraging nontraditional enrollments. (K_h)								X
	Distinguish between encouraging, assisting, decision-making, and providing support. (K_p)								X
	Schedule nontraditional women to enhance peer support for the same time the course is offered. (K_p)								X
	Expand the guidance function at the postsecondary level until there's expanded and useful exploration at lower school levels. (K_p)								X
	Obtain more educational personnel equipped to assist decision making. (K_p)								X

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
POLICY PLANNING IMPLEMENTATION	Address the indication that women education personnel are sustaining occupational stereotypes more than other educational personnel. (K_p)								X
	Evaluate systematically all career choice strategies to insure maximal effective use. (K_p)								X
OCCUPATIONAL AWARENESS	Purchase and display nonsexist occupational materials (e.g., contrast sexist and nonsexist ideas). (L)						X		
	Explain expectations and job opportunities of nontraditional training and encourage enrollment of women showing appropriate aptitude and interest. (N)					X			
	Increase efforts to introduce pre-adolescent girls to successful women in all types of work, including vocational training. (M)								X
	Recruit more nontraditional teachers for role models. (L)				X				
	Be informed to expand students' vocational options. (L)					X			
	Hold career fairs with nontraditional and traditional role models. (L)					X			
	Be aware of work world problems. (L)				X				

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
OCCUPATIONAL AWARENESS	Include articles in school newspapers on nontraditional work, interviews, and statistics on median salaries. (L)								X
	Recognize and communicate to students that unusual fears are groundless based on research of nontraditional job satisfaction, wages, rate of unemployment; and reflections about vocational training. (L)					X			
	Provide exhibits of both nontraditional and traditional role models for both sexes and the same jobs. (L)						X		
	Provide prevocational high school students (especially effective with women) with introductory elective vocational courses and familiarize them with career options. (L)								X
	Supply more information in vocational program handbooks about potential salaries and job opportunities. (L)								X
	Build flexible exploration programs which treat a cluster of related occupations as students may be more likely to perceive nontraditional opportunities and in a favorable light than in narrow vocational programs. (L)								X
	Provide an informational program to encourage student awareness of nontraditional opportunities for men in office occupations and provide avenues for their enrollment. (D)								X

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
OCCUPATIONAL AWARENESS	Stimulate interest in careers earlier in students as this seems to be the easiest way to change attitudes about stereotypes. (K_h)								X
	Expand involvement of women students in planful job site visitation programs, insuring a cross-section of all occupations, which outside agencies may not do. (K_h)								X
	As an alternative strategy, consider stressing sex-integrated occupations with traditional students. (K_h)								X
	Provide more and earlier opportunity to explore nontraditional options at the junior and senior high levels. (K_p)								X
	Encourage women to enter nontraditional occupations that are less stereotyped (where difficulty and resistance from others is less likely). (K_p)								X
	Attract most women to nontraditional training on the basis of interest, ability, and working conditions through earlier and broadening hands-on experiences; stress earnings with those interested in sex-integrated programs, poor, and minority students. (K_p)								X

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
SELF-AWARENESS	Encourage student awareness while advising student organizations. (L)				X				
	Provide support during the first critical weeks back in school. (N)					X			
	Provide an example and a resource if currently or formerly enrolled in nontraditional courses (e.g., woman and man from the same field for guest speakers). (L)							X	
	Support each other's interest and courage to enroll nontraditionally. (L)							X	
	Give nontraditional enrollees, especially Black women, lots of reinforcement because their rating of interest higher than ability as enrollment factors may mean a lack of confidence in their ability. (K_h)								X
	Build self-assurance regarding nontraditional occupations so that students can put job information in perspective. (K_p)								X
SEX FAIR COUNSELING/ CURRICULUM DEVELOPMENT	Offer preparatory socialization programs as nontraditional students are about to enroll. (L)								X
	Offer a school reorientation class for mid-career/returning housewife students. (N)		X						
	Provide low-cost programs with short, flexible, on-the-job training experiences and individualized instruction. (N)		X						

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
SEX FAIR COUNSELING/ CURRICULUM DEVELOPMENT	Provide innovative leadership to foster and support sex equity efforts. (L)			X					
	Involve all persons responsible for implementing strategy in participating throughout the planning process. (L)								X
	Especially employ competent women for nontraditional positions (suggesting perhaps a more urgent role model need?). (L)			X					
	Examine exploratory experiences, career modeling, and faculty/administration expectations for sex biases. (I)			X	X	X	X		
	Seek sex fair materials and deal with ones they have (e.g., stamp on directions on how to read pronouns). (L)					X			
	Get new non-stereotyped career materials. (I)			X	X	X	X		
	Change sex biased materials or address their bias constructively. (I)			X	X	X	X		
	Review and revise existing materials or develop new ones with nontraditional information on requirements. (I)	X							
	Integrate home economics and industrial arts at the junior high level, providing "survival skills" to all students while breaking down stereotypes about appropriate courses, occupations, and sex roles. (L)								X

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
SEX FAIR COUNSELING/ CURRICULUM DEVELOPMENT	Integrate work world and family living courses for a "Work and Living Options" course to help girls and boys prepare for interaction within their future work and personal life. (L)								X
	Build an unbiased guidance program beginning in elementary school to insure exposure to girls and boys of a range of vocational opportunities long before they must decide. (L)								X
	Offer counseling situations whereby a woman can cope with influences in her life and come to terms with mid-career change. (N)					X			
	Offer special counseling (group, individual, career, and single parent).					X			
	Offer complete, sex-fair aptitude testing. (N)					X			
	Solicit and utilize feedback from mid-career change graduates to better prepare those currently enrolling. (N)					X			
	Examine innovative departures from traditional office education programs to make curriculum responsive to changing times. (D)								X
	Build student support for enrollment based on interest and aptitude. (L)							X	
	Consider discontinuing vocational testing unless or until unbiased tests are available. (K_h)								X

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
SEX FAIR COUNSELING/ CURRICULUM DEVELOPMENT	Provide counseling support programs. (K_h)								X
	Examine techniques used in group counseling to maximize the potential of this support network and consider shifting the emphasis from individual counseling and vocational testing to more useful models. (K_h)								X
	Identify and analyze effective career education components. (K_h)								X
IN-SERVICE	Provide in-service/training programs for teachers. (I)	X							
	Encourage in-service training (workshops, seminars) to sensitize staff and help develop strategies to achieve sex equity. (L)			X					
	Encourage or subsidize workshop participation. (L)					X			
	Provide staff members in-service training regarding women mid-career changers. (N)		X						
	Increase teacher awareness and training to develop strategies. (I)			X	X	X	X		
	Increase teacher/counselor awareness of their impact on enrollment. (I)			X	X	X	X		
	Attend workshops. (L)				X				
	Understand how greatly sex typed behavior and expectations can influence achievement. (L)				X				

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
IN-SERVICE	Examine classroom attitudes and actions. (L)				X				
	Review/revise course material or address existing bias constructively. (L)				X				
	Learn how to discuss nontraditional careers in class without making nontraditional students (especially, if they excel) feel self-conscious. (L)				X				
	Provide workshops and pre-service training of counselors related to their attitudes toward vocational education for girls. (M)								X
	Increase counselor training in job requirements and interpreting abilities and aptitudes. (I)			X	X	X	X		
	Have a working knowledge of sex equity legislation. (L)					X			
	Listen to oneself to insure sex fairness. (L)					X			
	Develop awareness of sex stereotyping necessary to provide unbiased guidance to students. (L)					X			
	Initiate a program to orient faculty generally and counselors specifically to nontraditional training for men. (D)								X
	Provide support and training on assisting expanded career choice to all educational personnel (both academic and vocational, both counselor and teacher, both junior high and high school) since they all are potentially influential. (K_h)								X

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
IN-SERVICE	Train men teachers especially to pave the way for better adjustment to nontraditional students in class--perhaps by a buddy system requiring women and men to work together and by correcting teachers' perceptions--as well as those of both women and men students--regarding expectations and images of nontraditional women. (K_h)								X
	In-service male vocational teachers because, despite their marked responsiveness to the survey, they do not see themselves as influential or prepared to be so. (K_h)								X
	Provide preservice and in-service for teachers and counselors to encourage use of sex fair materials and programs. (K_p)								X
	Make teachers aware of their impact on students' career choice (especially by training men vocational teachers and by addressing career decision making in teacher education). (K_p)								X
COLLABORATION	Discuss and develop strategies with other teachers. (L)				X				
	Cooperate with public schools of all levels to widen career aspirations and break down stereotypes in both sexes. (N)		X						
	Enlist collaboration of parents, students, and community with personnel. (L)		X						

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
COLLABORATION	Establish contacts with instructors working with mid-career changers. (N)					X			
	Work with subject-area advisory committees to keep informed about current working conditions. (L)					X			
	Maintain linkage with counselors of feeder schools to insure that information gets to all prevocational students. (L)					X			
	Sponsor a program to bring nontraditional workers and students into classes to work directly with students (cf. National Science Foundation Program for Women Scientists). (I)	X							
	Go to feeder schools to recruit prevocational students. (L)							X	
	Promote linkage between the whole school and vocational education to insure overall positive climate for sex equity. (L)			X					
	Establish closer relations between interdisciplinary areas of community colleges to open avenues for entry by other majors to broaden interest and preparation of office education majors. (D)								X

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
COLLABORATION	Reach academic teachers so that they can assist expansion of career choices (especially since junior high students are unlikely to have many vocational education teachers). (K_h)								X
	Reach out beyond school early to parents so they can give informed support and involvement. (K_h)								X
	Include parents and peers in group discussions within assistance programs. (K_p)								X
	Apply counselor training to assisting parents and teachers in guidance process. (K_p)								X
	Use outside resources (e.g., trade unions, women's groups, former students, parents, and employers) to provide both traditional and non-traditional occupational information. (L)				X				
	Cooperate with business and industry to break down stereotypes. (N)		X						
	Maintain linkage with employers to encourage their sex fair behavior. (L)					X			
	Meet with equal rights groups to publicize school concern and benefit from their expertise. (L)			X					

Need Area	Strategy	Implementer**							
		SB	I	A	T	C	L	S	U
COMMUNITY INVOLVEMENT	Hold open forums on sex stereotyping for parents, community leaders, employers and school personnel. (L)			X					
	Foster a community awareness program through business and industry to provide a market for cooperative training and employment. (D)								X
	Develop closer relations with members of business and labor to encourage their participation as advisors. (D)								X

CONSTRUCTION CLUSTER
3.1.8 STRATEGY

IMPLEMENT PLANNED ACTIVITIES FOR RECRUITING WOMEN INTO NONTRADITIONAL JOB ROLES IN THE CONSTRUCTION CLUSTER.

The following chart identifies strategies for implementing activities to increase the number of women into nontraditional job roles in the construction cluster.

STRATEGY	IMPLEMENTER						
	DO	SA	T	C	L	S	P
Inform parents, educators and students about sex stereotypes, sex biased materials, and the possible consequences for girls and boys.	X	X	X	X		X	
Advertise programs, career options, and institutional interest in enrolling nontraditional students, especially female, in pre-vocational, vocational and construction cluster programs. Recommended publications include: Vocational newspapers Community newspapers School newspapers Parent newsletter Beaverton District Green Sheet Beaverton 48 Report School Guides to Program Planning Brochures, flyers	X	X	X	X	X	X	
Review and revise existing career-related materials in the district materials center, school library, counseling center, student handbook, program descriptions, course syllabi and handouts so that all materials are sex-fair, encourage non-traditional students, and enhance student occupational wareness and sense of worth	X	X	X	X	X		

DO District office designee
SA School Administrator
T Teacher
C Counselor
L Librarian
S Student

STRATEGY	IMPLEMENTER						
	DO	SA	T	C	L	S	P
Heighten career awareness by obtaining and displaying current nonsexist career information on bulletin boards, book shelves and display cases.			X		X		
Build an unbiased guidance program beginning in elementary school to insure girls exposure to a wide range of vocational opportunities long before they must make career decisions.		X		X			
Increase efforts to introduce preadolescent girls to successful women in all types of work, including traditional and nontraditional fields, through guest speakers, career days, and other activities.	X	X	X	X			
Be accessible to prevocational students on individual and group tours of vocational program areas, and organize groups of current nontraditional students to make presentations at elementary school sites.		X	X				
Provide more and earlier opportunities to explore nontraditional options at intermediate and senior high school levels so that mature decisions can be made without internal or external pressures and follow-through by enrolling in appropriate courses is facilitated.		X	X	X			

STRATEGY	IMPLEMENTER						
	DO	SA	T	C	L	S	P
Integrate home economics and industrial arts at the intermediate school level, providing "survival skills" to all students while breaking down stereotypes about appropriate courses, occupations and sex roles.		X	X				
Build flexible exploration programs which treat a cluster or related occupations so that students can perceive non-traditional careers in a more favorable light than usually observed in narrow vocational programs.		X	X				
Assure students of sex-fair enrollment opportunities through an adequate supply of nontraditional promotional materials and general career materials that relate occupational requirements to job title rather than gender.		X		X			
Encourage prevocational and vocational enrollment and provide support for nontraditional students during school, especially the first critical weeks.			X	X			
Commit needed time and resources to involve all school personnel in awareness raising, sex role stereotyping, and comprehensive information about student vocational options.	X	X	X	X	X		
Increase the number of women nontraditional vocational education teachers.	X	X	X	X	X	X	

STRATEGY	IMPLEMENTER						
	DO	SA	T	C	L	S	P
Enlist the collaboration of parents, students and the community with educators to reduce sex role stereotyping, supply both traditional and nontraditional occupational information, widen career aspirations, and provide role models. Recommended resources:	X	X	X	X	X	X	
Cluster advisory councils Construction Food Service Health Child Services Marketing Accounting Business Occupations Local school committees Business organizations Student government Trade unions Women's groups Former students							

Activities identified in Strategy 3.1.8 will be evaluated in conjunction with the planned evaluation process for the entire RFP.

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APPENDIX Y

The Cooperative Work Experience program requires that a student be concurrently enrolled in a career cluster program, be employed on a job related to an educational major or career goal, and become involved in new learning experiences on the job. The program is designed for the student who desires early occupational training in a well-established career area. It is a program where equal opportunities are provided for both males and females.

Cooperative Work Experience can be a paid or non-paid experience. The only restriction on non-paid experience is that it must conclude prior to the end of the school day. After that time, it must be a paid experience and the wage must reflect that being paid to others not in the program. An example of a non-paid experience could be helping with the construction of a church where the entire congregation is involved in some way, depending on their ability and skill area. Paid work experience can vary since any job associated with a cluster would qualify for credit. For example, those jobs suitable for credit under the construction cluster would include clerking in a hardware or wallpaper store, painting, tile setting, home maintenance, general construction work or filling orders in a lumber yard.

Successful work-experience programs include effective instruction both in school and on the job. The school program of related instruction supplements hands-on experience at the job site. Learning on the job should make the classroom instruction more relevant to the student.

The Cooperative Work Experience program is well-equipped to prepare students with varied abilities with a wide range of occupational goals. The only limitation lies in the number of potential training stations available in an occupational field. Without a reasonable balance between manpower

demands and labor supply in an occupational field, the vocational goals of a number of cooperative education graduates will not be met. Students must be able to get a job before they lose their skill and zeal for the occupation for which they have been trained.

The success of Cooperative Work Experience depends greatly on the selection of suitable training stations. Training stations should have the potential to provide training for occupations that are challenging and worthy of the students' time and efforts. On-the-job training should be matched to the capabilities and interest of the students. It is essential that training stations provide sponsors who are competent in their occupations and who are able and willing to train students.

Guidance and counseling are also essential elements in a cooperative program. There should be on-going cooperation between guidance personnel, the cluster teacher, and the work experience coordinator. It is these people that will identify students who can most profit from Cooperative Work Experience education.

The Cooperative Work Experience program should provide the following services for its students:

1. Provide students with an awareness of career opportunities.
2. Help them to acquire valuable employer references.
3. Allow them to earn while they learn, not only a salary, but one unit of credit each year.
4. Permit them to analyze career requirements by actual involvement in a career field.
5. Combine classroom theory with practical application of on-the-job experience.
6. Put students ahead of their classmates upon graduation because they have had on-the-job experience.

Complying With Labor Laws

The Work Experience Coordinator is expected to know the local, state, and federal labor regulations that apply to students and to the work stations where they are placed. One such regulation follows.

In a job area such as construction, where much of the work is subject to laws on hazardous occupations, a coordinator needs to be especially aware of Federal Child Labor Bulletin 101. This regulation allows cooperative work experience students to work in hazardous areas if it is in conjunction with their training program.

Training Plans

The purpose of a training plan is to organize instruction and to correlate classroom learning and on-the-job training. The teacher-coordinator, the employer, the training sponsor, and sometimes the student, together determine the specific learning experiences which will be provided on the job and the specific related curriculum which will be covered in school.

The employer and the training sponsor should be able to specify the learning experiences which lead to occupational competence. However, the coordinator may have to provide checklists or a general outline of possible on-the-job experiences from which the employer and the training sponsor can designate the areas of instruction which they can provide. Then they can add those experiences which are unique to the specific job and work station.

Evaluating Student Achievement

Student progress in acquiring occupational capabilities and competencies is the basis for evaluation in cooperative education.

Evaluation is a measure of the degree to which the student has achieved the objectives of training and instruction. The purpose of evaluation is to determine whether or not the student is competent in the occupation, to verify that the learning experiences were effective in developing occupational capabilities and competencies, and to identify areas of strengths and weaknesses in order to plan further instruction.

(Following is a sample of the Beaverton High School evaluation tool.)

BEAVERTON HIGH SCHOOL
EMPLOYEE PERFORMANCE AND WORK APPRAISAL

Student _____ Supervisor _____

Employer _____ From _____ to _____
Rating Period

TO THE EMPLOYER: Please place a check mark in the approximate "Range" category; select the numerical value within that range and place the value in the "Rating" column at the right.

FACTOR	RANGE				RATING	COMMENTS
ADAPTABILITY	Normal ability, routine worker 4-6	Learns slowly, reluctant to change 0-3	Willing to change 7-9	Learns rapidly; adjusts quickly 10-12		
APPEARANCE AND GROOMING	Exceptionally neat and appropriately groomed 7-8	Inappropriate for work 0-2	Satisfactory 5-6	Needs improvement 3-4		
UNSCHEDULED ABSENCE	2 days absent 4	1 day absent 8	No days lost 8	3 or more days absent 0		
WORK ATTITUDE	Enthusiastic 7-8	Interested 5-6	Average 3-4	Not interested 0-2		
DEPENDABILITY	Highly conscientious 13-16	Reliable 9-12	Satisfactorily completes work as told 5-8	Unreliable 0-4		
WORK STATION HOUSEKEEPING	Disorganized 0-2	Usually neat and clean 5-6	Satisfactory appearance 3-4	Extremely neat and orderly 7-8		
INITIATIVE	Performs assigned work with supervision 4-6	Requires a maximum of supervision 7-9	Shows originality and resourcefulness 10-12	Requires constant supervision 0		
JOB SKILLS	Exceptional 15-20	Demonstrates required skills 10-14	Satisfactory 5-9	Needs improvement 0-4		
PERSONALITY	Disagreeable 0-2	Well liked and respected 7-8	Average 3-4	Liked and respected 5-6		
PRODUCTION/ QUALITY	Needs improvement 0-4	Tasks well performed 10-14	Exceptional 15-20	Average 5-9		
PUNCTUALITY	Is always on time 0	Satisfactory 4	Needs improvement 0	Exceptional (Arrives early) 8		

Rater's Signature _____ Employee's Signature _____

Additional Comments _____

PARTICIPANT EVALUATION FORM

As a participant in this session, please rate each criteria statement according to your own perceptions of the activity.

Criteria Statement	Excellent	Average	Poor
1. Objectives were identified at the beginning of the session.			
2. The activities were appropriate to meet the objectives.			
3. Participants received adequate background information and assistance for completing the assigned activities.			
4. There were identifiable outcomes from the session.			
5. The next steps for participant involvement were identified.			
6. Comments:			

TRANSPARENCY MASTERS

STEPS FOR PLANNING, DEVELOPING AND IMPLEMENTING MODEL VOCATIONAL PROGRAMS

THESE MASTERS CAN BE USED FOR DEVELOPING TRANSPARENCIES FOR AN OVERHEAD PROJECTOR. THE TRANSPARENCIES ARE TO BE USED IN CLARIFYING THE STEPS OF MODEL DEVELOPMENT TO PLANNING GROUPS, ADVISORY COMMITTEES AND OTHERS THAT NEED UNDERSTANDING OF THE PROCESS.

PLAN

ORGANIZE HELPERS

COLLECT IDEAS

CONTACT INDUSTRY

IDENTIFY CURRICULUM NEEDS

DEVELOP PLANS

ORGANIZE HELPERS

STEERING COMMITTEE

ADVISORY COMMITTEE

COORDINATING COMMITTEES

COLLECT IDEAS

OREGON DEPARTMENT OF EDUCATION (ODE)

OREGON OCCUPATIONAL INFORMATION COORDINATING COUNCIL (OOICC)

LIBRARY INFORMATION RETRIEVAL SYSTEM (LIRS)

CONTACT INDUSTRY

MANAGEMENT INTERVIEWS

TASK INVENTORY

TASK ANALYSIS

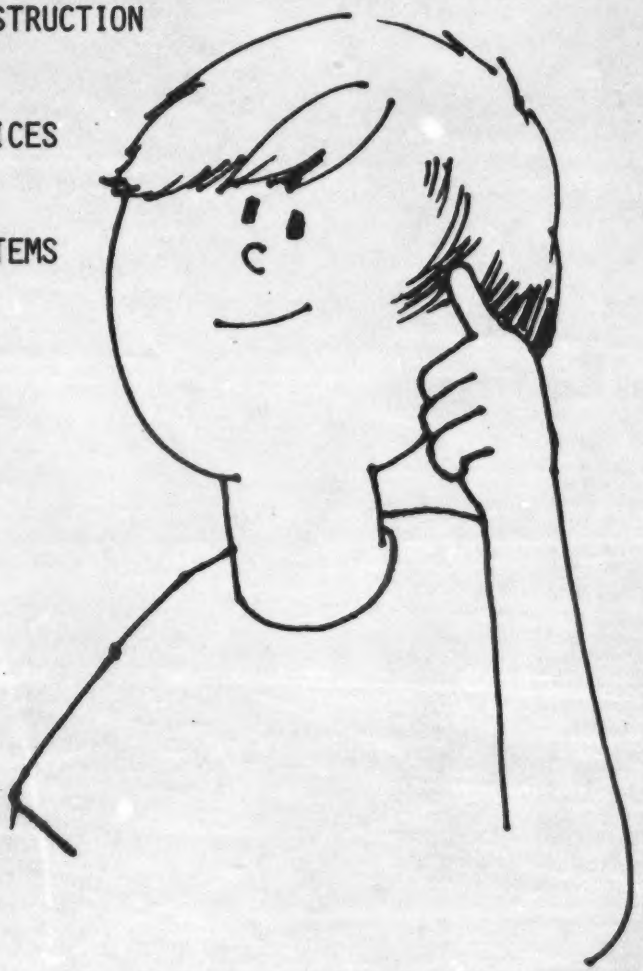
IDENTIFY CURRICULUM NEEDS

SKILLS, KNOWLEDGES AND ATTITUDES

LEVELS OF INSTRUCTION

SUPPORT SERVICES

DELIVERY SYSTEMS



DEVELOP PLANS

RATIONALE	(WHY)
GOALS	(WHAT)
OBJECTIVES	(WHAT)
ACTIVITIES	(HOW)
TIMELINES	(WHEN)
RESPONSIBILITY AGENT	(WHO)

DEVELOP MODEL PROGRAM

CURRICULUM

SUPPORT SERVICES

SPECIAL NEEDS

ARTICULATION

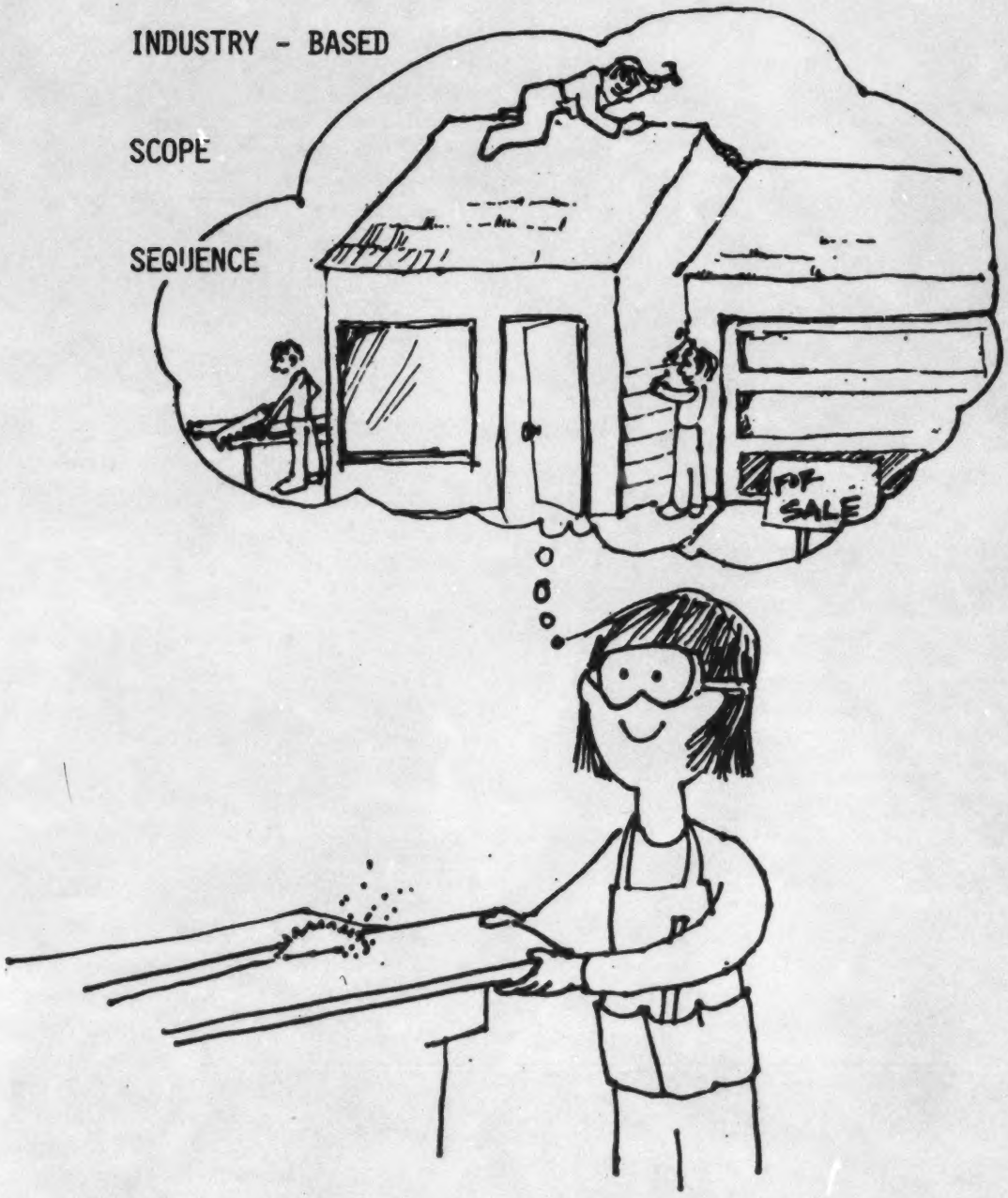
COMMUNITY RESOURCES

CURRICULUM

INDUSTRY - BASED

SCOPE

SEQUENCE

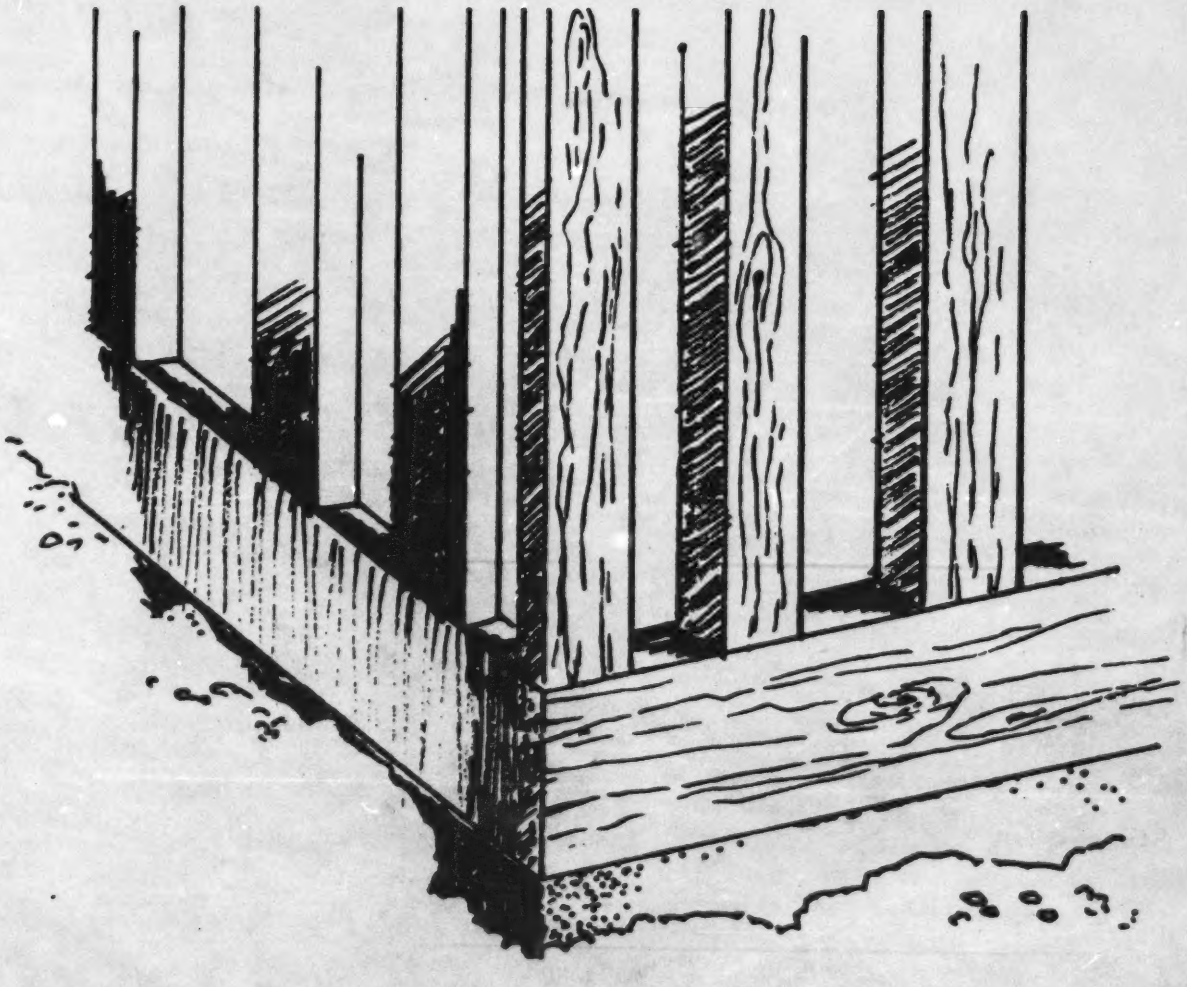


SUPPORT SERVICES

GUIDANCE

PLACEMENT

FOLLOW-UP



SPECIAL NEEDS

REMEDIAL SKILLS

HANDICAPPED

DISADVANTAGED

SEX EQUITY

ARTICULATION BRIDGES

APPRENTICESHIP

INDUSTRY

EXPLORATORY CLASSES

COMMUNITY COLLEGE

COMMUNITY RESOURCES

ADVISORY COMMITTEE

DELPHI PANELS

COOPERATIVE WORK EXPERIENCE

RESOURCE PERSONS

IMPLEMENT MODEL

IMPLEMENT

MONITOR

REVISE

IMPLEMENT

CURRICULUM

SUPPORT SERVICES

STRATEGIES FOR SPECIAL NEEDS GROUPS

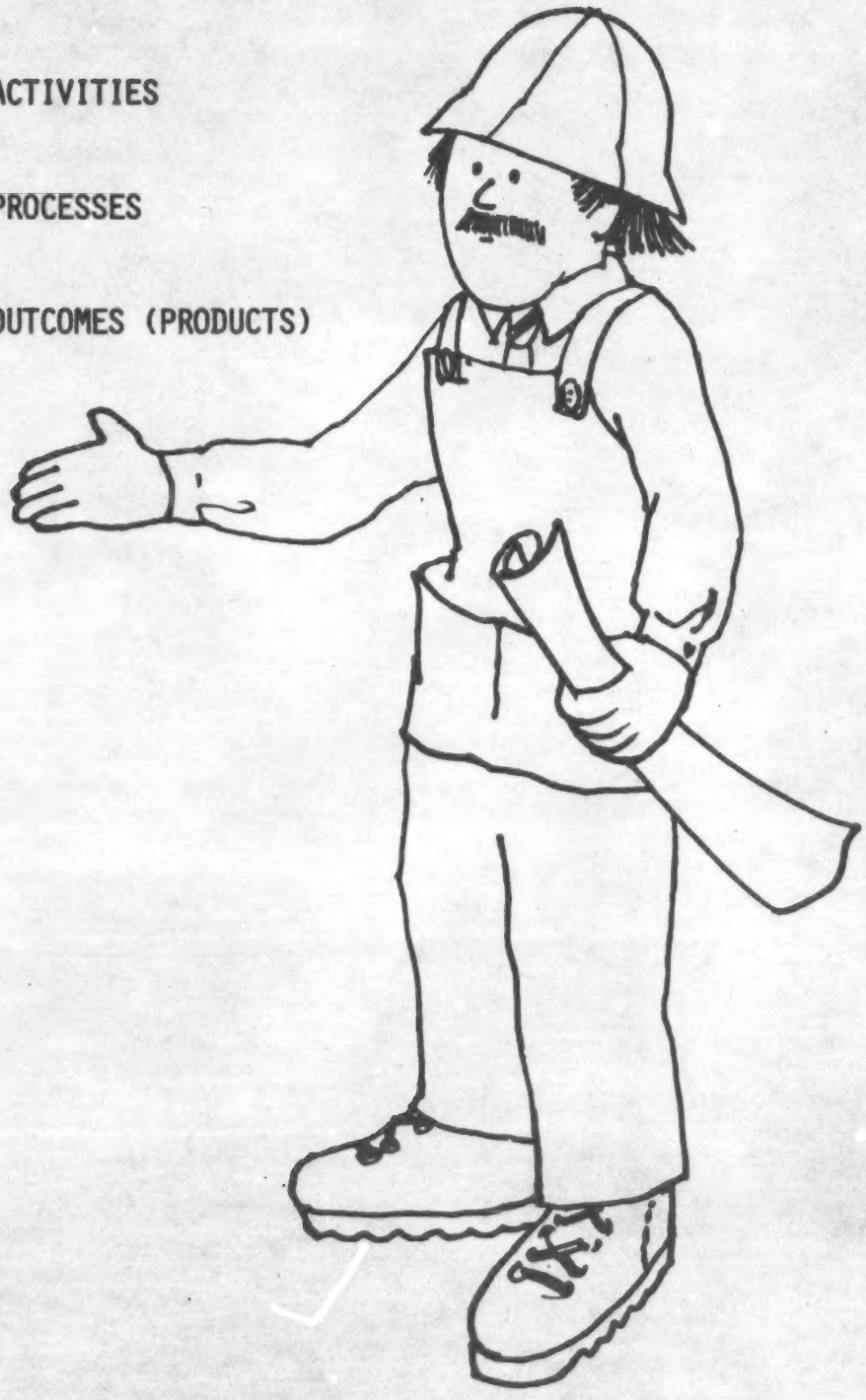
RELATED ACTIVITIES

MONITOR

ACTIVITIES

PROCESSES

OUTCOMES (PRODUCTS)



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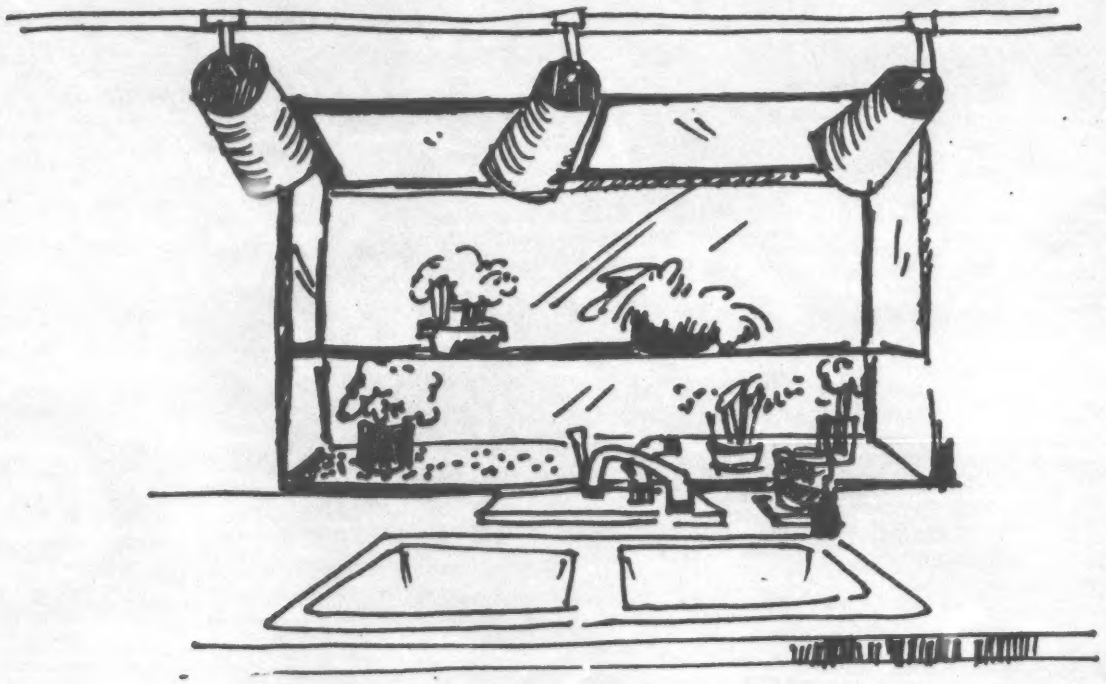
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